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New York Zoological Society Annual Report 1980-81

Profile of the New York Zoological Society

Founded in 1895, the New York Zoological Society consists today of five major divisions operating facilities in the United States and worldwide: the New York Zoological Park (Bronx Zoo); the New York Aquarium and Osborn Laboratories of Marine Sciences in Brooklyn; the Wildlife Survival Center on St. Catherine's Island, Georgia; and the Animal Research and Conservation Center (ARC), headquartered at the Bronx Zoo. Abroad, ARC maintains stations in the Kibale Forest, Uganda, Peninsula Valdes, Argentina, and Nairobi, Kenya, and supports active research projects in more than twenty-five additional countries, ranging from the People's Republic of China to Brazil and from India to Zambia. The Society's staff of 355 in all divisions consists of curators, educators, veterinarians, animal keepers, research scientists, writers, administrators, artists and designers, photographers, gardeners, technicians, and a host of other support and maintenance specialists.

The *Bronx Zoo* and *New York Aquarium* are sensitive and popular tools for teaching environmental education in the nation's urban capital. Serving a Metropolitan New York population of more than 17,000,000, as well as visitors from around the world, they combine nature, recreation, and education as do no other city institutions. In particular, they seek to arouse an interest in wild creatures and to stimulate compassion for them. In recent years, the captive collections of the Zoo and Aquarium have begun to fulfill a new, if unwanted role as long-term repositories for vanishing species, sustaining and perpetuating rare and delicate creatures which are disappearing in nature.

The *Wildlife Survival Center*, founded in 1974, is wholly devoted to the propagation and study of endangered species, and acts as a kind of distribution center for the renewal, not only of zoos but also of nature itself.

The *Osborn Laboratories of Marine Sciences*, adjacent to the Aquarium and an integral part of its programs, has devoted its resources since 1968 to basic studies in the mechanisms of heredity, the characteristics and cure of fish diseases (with a special view toward the application of this work to aquaculture), and to broad investigations in marine ecology.

The object of the *Animal Research and Conservation Center* is to save pieces of nature. No other private conservation organization has a research program conducted by a staff of comparable size and expertise. As George Schaller, Director of ARC, has written, "We strive to obtain a better understanding of the structure, functioning and stability of large ecosystems and to apply this understanding to their conservation." ARC's distinctive approach has already resulted in the creation, enlargement, or strengthening of several reserves and parks, and in the education of many to whom the future is entrusted.

Highlights and Vital Statistics

Attendance totaled 1,737,441 at the Bronx Zoo and 414,258 at the New York Aquarium between July 1, 1980 and June 30, 1981. The Society's general expenditures for that period were $17,176,187. Membership in the Society reached 19,100, bringing to about 30,000 the number of individuals, foundations, and corporations contributing $4,632,000 in dues and gifts.

Nine hundred twenty-nine mammals, birds, reptiles, and amphibians were bred at the Bronx Zoo and Wildlife Survival Center, including many endangered species.

Some noteworthy births and hatchings: Snowflake, polar bear; Julia and Kelele, gorillas; eight snow leopards; sixteen Barasingha deer; three Andean condor chicks, released in Peru; seven white-naped cranes; one trumpeter swan; twenty-one Chinese alligators; six Malagasy radiated tortoises.

Under the comprehensive program of Zoo Renaissance, fourteen major construction and renovation projects—buildings, exhibitions, and support facilities—were completed or underway at the Bronx Zoo, including the new Children's Zoo, the Sea Lion Pool, the De Jur Aviary, the Rare Large Mammal Building, and Jungle World.

In the first two months of its operation, the new Children's Zoo drew more than 247,000 visitors, nearly the total previous year's attendance in the old Children's Zoo.

Three major exhibitions were installed at the New York Aquarium: the shark exhibition, the Bermuda Triangle, and the African Rift Lake.

A contract for operation of the Central Park Zoo by the Society was signed with the City of New York in April 1980. Plans for redesigning that antiquated facility, as well as for the Prospect Park and Flushing Meadows zoos, have been drawn up or initiated, and further action awaits ratification of the contract by the City.

The Animal Research and Conservation Center sponsored sixty-one research projects—in Africa, Asia, South America, North America, the Caribbean, and the Pacific—including the first cooperative program with the People's Republic of China, concerning preservation of the giant panda.

New York Zoological Society Annual Report 1980-81

Cover:
The discovery of the crested iguana, a species previously unknown to science, symbolizes the many evidences of rebirth and renaissance at the New York Zoological Society over the past year and one half. See back cover for story of the iguana's discovery. Photos: Dr. John Gibbons

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Table of Contents

Trustees and Advisors 2

Report of the President 5

Report of the General Director 9

A Renaissance at the Zoo 15

New York Zoological Park 19
Mammalogy 19
Ornithology 22
Herpetology 25
Wildlife Survival Center 27
Animal Health 29
Zoo Education 31
Exhibition and Graphic Arts 35
Operations — Construction and Maintenance 37

New York Aquarium and Osborn Laboratories of Marine Sciences 39
Aquarium Education 39

Animal Research and Conservation Center 45
ARC International Field Projects 48

1980/81 Scientific Publications and Papers 50

Publications Department 52

Public Affairs 55
Development 55
Membership 56
Public Relations 57

Administrative Services 58
Admissions, Parking, and Transportation 58
Food and Souvenirs 58
Personnel 59

Report of the Treasurer 61
Audited Financial Statements 64

Contributions, Pledges, and Payments on Pledges 68

Animal Kingdom Fund Contributors 70

Committees of the New York Zoological Society 71

Staff of the New York Zoological Society 72

Report of the President

Delivering the Fairfield Osborn Memorial Lecture in Environmental Science in 1980, His Royal Highness, The Prince Philip, Duke of Edinburgh, observed that, "in the final analysis nature is at risk through the conflict of human interests." The Society's trustees and staff believe that it is only through education and research that this conflict may be resolved, and on six continents and in the five boroughs of New York City we have pursued our scientific and educational goals in the past eighteen months with some rewarding success. The many reports which follow, covering the time period beginning January 1, 1980, and ending June 30, 1981, document the Society's recent work, including important progress in our work with New York City concerning the Central Park Zoo, and such major news from the Bronx Zoo as the opening of a new Children's Zoo.

The Duke of Edinburgh's address, entitled "Conflicts of Interests," took place on October 1, 1980, at Avery Fisher Hall. The Osborn Lecture is named in memory of the late President of the Zoological Society and is sponsored on a rotating basis by the Zoological Society, Rockefeller University, and the Conservation Foundation. The lecturer was guest of honor at a dinner afterward at which 1,000 contributors to the Society's Animal Research and Conservation Center (ARC) were present. This major fund-raising event generated $738,000 for the purposes of the Animal Research and Conservation Center, and a portion of the proceeds was earmarked for World Wildlife Fund use in the cooperative panda research program being conducted in China by the Fund and ARC.

The dinner in honor of The Duke of Edinburgh was the result of a nationwide volunteer effort, led by Mrs. Vincent Astor, one of the Society's most devoted Trustees, and Laurance Rockefeller, Honorary Chairman of the Board, who served with me as co-chairmen of this event. A National Committee was chaired by Mr. and Mrs. John B. Carter, Jr., Mr. and Mrs. Charles A. Dana, Jr., Mr. and Mrs. Marshall Field, Mr. and Mrs. Edward H. Gerry, Mr. and Mrs. Frank Y. Larkin, Mr. and Mrs. Peter McBean, Frederick A. Melhado, Hon. and Mrs. Emil Mosbacher, Jr., Mr. and Mrs. John Pierrepont, and Mr. and Mrs. Vernon Taylor, Jr.

His Royal Highness, The Prince Philip, Duke of Edinburgh, who delivered the 1980 Fairfield Osborn Memorial Lecture in Environmental Science at Avery Fisher Hall, Lincoln Center, on October 1, was joined at the press conference by ARC Director George Schaller and NYZS President Howard Phipps, Jr.

Moose and his companions at the new Sea Lion Pool.

The Benefactors and Sponsors were led by Mr. and Mrs. Michel C. Bergerac. The generosity of 1,000 friends is to be acknowledged in general, but in particular I want to thank Mr. Bergerac and Revlon, Inc. for their leadership; Mr. and Mrs. Cortland Parfet for their special contributions; Culbro and Mr. and Mrs. Edgar M. Cullman for underwriting the major expenses of the Lecture; John Chancellor for his charming service as Master of Ceremonies; and, especially, the Duke of Edinburgh for traveling from London to share his informed ideas and views with 2,500 Americans who also care about the natural world.

The Society's many other programs to generate the support of the private sector have been pursued in the past eighteen months with the help of hundreds of volunteers. Chief among these are the Business Committee, under the co-chairmanship of Edgar M. Cullman and John Elliott, Jr.; the Animal Kingdom Fund Committee, chaired by John N. Irwin II; and the Women's Committee, chaired in this period by Mrs. Driggs Hultkrans. The Business Committee gathered 220 corporate gifts totaling $428,000 in the fiscal year ended June 30, 1981; the Animal Kingdom Fund had grown to $11,164,852 by June 30; and the Women's Committee fund-raising dinner dance at the Zoo in June resulted in contributions of $320,000. The Board is extremely grateful for the energetic commitment and productivity of all of these volunteers, and we want to express our formal thanks.

Important contributions received during this eighteen-month period include an anonymous gift to the ARC endowment in memory of Walter Bourchier Devereux III; leadership gifts to Phase II of the Animal Kingdom Fund from The Vincent Astor Foundation and The Bodman Foundation; and contributions for the construction of the Children's Zoo from the Louis Calder and Surdna foundations, and from Mrs. E. Roland Harriman. Major gifts for operating purposes have been received from several individuals, including Mrs. Agnes Cowperthwaite and Mrs. Alexander S. Haig, and from seven corporations whose gifts are or exceed $25,000. They are Citibank, Exxon, Manufacturers Hanover Trust, New York Telephone, Revlon, Inc., Rockefeller Center, and the Starr Foundation (American International Group).

Fabricated child-size turtle shells are among the thirteen participatory exhibits in the new Children's Zoo.

There have been a number of additions and changes in the past year and a half among the Society's Board of Trustees. The Board was expanded to include the New York City Parks Commissioner as an *ex-officio* member. The bylaws were also amended to create a group of Honorary Trustees, and the first persons to be recognized in this manner were Robert E. Blum, James Walter Carter, David Hunter McAlpin, John H. Phipps, John M. Schiff, Alice Tully, Lila Acheson Wallace, and Robert Winthrop. During the period since January 1, 1980, the Society lost two long-term, devoted members, Landon K. Thorne, Trustee, and Peter Grimm, Advisor, both of whom died during 1980, and resolutions of the Board document the sadness we felt in losing such good friends.

Mrs. Edgar M. Cullman, Arthur Hauspurg, and W. Barnabas McHenry, all three already active volunteers and people well aware of the Society's activities, were elected to the Board of Trustees. Eben W. Pyne was elected to the Executive Committee, and John McKew succeeded Harold C. Palmer as Assistant Secretary.

The Board of Advisors, elected annually, was expanded by the addition of seven new members in December 1980: Rand V. Araskog, Mrs. Charles A. Dana, Jr., Mrs. James H. Evans, Peter C.R. Huang, John E. Leslie, Mrs. Gordon Pattee, and William Wachenfeld. Most of these individuals have been exposed to the Society's work through their participation on the Business Committee or the Women's Committee.

Howard Phipps, Jr.
President

Report of the General Director

A Bronx Zoo condor soars high above the Peruvian Andes.

Annual reports tend to steer uncertainly between straightforward, often dull recitations of annually obsolete figures and exercises in institutional self-promotion. Fans of both extremes will find satisfaction on these pages. The activities of the Zoological Society, however, are inextricably bound to the living creatures it cares for and the questing public it serves. This is rarely dull.

As I write this eighty-fifth Report in New York, 3,000 miles to the south, so high on the wind as to be no more than wheeling specks against the thin clouds skimming the peaks of the Peruvian Andes, soar three New York Zoological Society condors. Each of these great birds began life as a white fist-sized egg deposited by zoo parents. Each hatched in an electric incubator in the Bronx Zoo's World of Birds and was painstakingly cared for by devoted keepers from the moment of laying until taken to Peru and released in a cooperative experimental program with the University of Wisconsin and the U.S. Fish and Wildlife Service. Now, for nearly ten months, the huge birds have been independently roosting on sheer cliffs by night while successfully hunting for food and competing with wild condors by day. Regular pulses emitted from wing-mounted radios allow them to be monitored as the drama of their daily efforts to survive unfolds. The artificial rearing and release of these South American condors, the former process thought improbable and the latter impossible by many conservationists, represent first steps in a grand experiment to find ways of helping other faltering great birds, especially the almost extinct California condor.

On the other side of the world, in the dense bamboo and rhododendron forests of China's remote Wolong Natural Reserve, the pulses of other radios reveal the locations of Zhen-Zhen, Ning-Ning, and Long-Long, wild giant pandas. There, George Schaller, Director of the Zoological Society's Animal Research and Conservation Center (ARC) is tracking them through their dripping, leech-infested habitat, conducting the first modern study of the panda undertaken in nature. His investigation is a cooperative project between the Swiss-based World Wildlife Fund and the People's Republic of China; ARC has been asked to conduct the study for the Fund. Already, details of pandas' daily range and feeding activities have become known, their strange calls have been recorded and the first views of their brief but violent courtship and mating reported, all of which contributes to the

Formosan sika deer, extinct in nature since 1973, have produced more than 300 offspring at the Bronx Zoo since 1940, including twenty-two fawns in 1980–81.

Angel parented one of the Andean condors now in Peru.

construction of a picture of what it will take to make the panda's future survival possible.

Closer to home, at the Zoological Park and its Wildlife Survival Center on St. Catherine's Island, 929 mammals, birds, and reptiles were bred in NYZS programs. They ranged from lowland gorillas, Père David's deer, and snow leopards to hooded cranes, wreathed hornbills, and greater curassows; from Malayan tapirs and tawny frogmouths to Yacare caimans, indigo snakes, and Indian elongated tortoises. Many of the births occurred among species now rare, including some already extinct in nature. Any animal propagation program that acts directly to perpetuate new generations of living creatures is engaged in renewal. However, a breeding program for vanishing animals is much more. It is recognition of the need to preserve the earth's crop seed.

On yet another front, researchers at the Osborn Laboratories of Marine Sciences have broken into the process of the transmission of genetic characteristics. Dr. Klaus D. Kallman, utilizing one species of fish, has bred small specimens which are sexually precocious, larger ones that mature extremely late, and still larger ones which never become sexually mature. The implications of these findings, obvious though they may be for aquaculture, also bespeak the value of an exceptional scientific resource that has been breeding strains of fishes for nearly seventy generations.

The random vignettes above do no more than touch the surface of the Zoological Society's scientific and conservation activities: their quest for understanding, their determination to sustain as many ''fragments of nature'' as possible and to contribute to human well-being. In a unique and powerful way the Society also supports manifold daily investigations and discoveries of elementary importance on another level, through the public collections at the Zoo and the Aquarium. Thousands of times each day, people of all ages and persuasions come face to face with other creatures and other life styles. It should be the birthright of every human being—city dweller or not—to encounter the world of nature anew, and it should be the responsibility and delight of each to attempt to understand it. Ultimately, our own survival as well as that of other creatures depends on the success of that attempt. The Zoo and the Aquarium are celebrations of life, classrooms and repositories dedicated to the understanding and preservation of living things for and by human beings.

Exhibition

This report covers a remarkable period in the development of the Zoo and Aquarium exhibitions. At the Aquarium several imaginative new displays were initiated, implemented, and completed at the same time that plans went forward to renew older structures. These are covered in the Aquarium report. At the Bronx Zoo, projects were active on as many as fourteen sites at one time. Completed were a new Sea Lion Pool, new amphibian and aquatic reptiles exhibitions in the Reptile House, a new bird nursery in the World of Birds, and a pace-setting new Children's Zoo. Achievements in this area are so numerous and outstanding that we have made them the subject of a special report, ''A Renaissance at the Zoo,'' which follows on page 15.

International conservation

With its first major direct-mail effort, its first major benefit, and its first full-time fund-raising staff, the Society's eighty-five-year-old international conservation program got off to a good start under its new name, as the Animal Research and Conservation Center. An important section of this report is given over to an account of its activities under Director George Schaller.

In January 1981, Society Vice-president John Pierrepont and Trustees John Irwin II and Frank Y. Larkin visited ARC projects in Tanzania and Kenya, accompanied by Research Zoologist David Western and myself, and met with local experts and government officials for a first-hand view of the changing status of East Africa's parks and wildlife. In October 1980, at the invitation of the Argentine government, I accompanied Dr. Felipe Lariviere, President of the Argentine National Park Service, on a tour of several new areas proposed as national parks, and provided counsel on their selection for this purpose. The successful establishment of a particularly spectacular park at Lago Pozuelos in northwest Argentina for altiplano flamingos and vicuñas was the most significant of many fortunate results.

Baths are part of the care routine for the Zoo's elephants.

City Zoos Project

On April 22, 1980, NYZS President Howard Phipps, Jr. signed a contract with Mayor Edward I. Koch in City Hall which, if ratified by the Board of Estimate, will provide for the eventual operation of the Central Park Zoo by the Society. Provisions for the future development of operating responsibility for the

Prospect Park and Flushing Meadow zoos, also worked out in complex and time-consuming negotiations with Commissioner of Parks Gordon Davis, reflect the City's desire to improve and renew antiquated facilities that have been the subject of prolonged criticism, and the Society's feeling of obligation toward New York's zoos.

The agreement protects the Zoological Society from major additional financial stress by providing that the City is ultimately responsible for operating costs. The understanding also provides that the City will pay for all capital redevelopment costs at the Brooklyn and Queens zoos. At the Central Park Zoo, the Society has agreed to contribute toward design costs.

Although the contract has not yet been ratified by the City, the Society has proceeded with plans for the Central Park Zoo and preliminary concepts for the other two zoos. By June 30, 1981, a detailed schematic program and plan had overcome many design problems and resulted in a proposal for a totally new Central Park Zoo set up along ecological and behavioral lines, featuring dramatic tropical and polar animal habitats with an ''Intelligence Garden'' between them. The latter exhibition's name indicates its purpose and borrows the title of a zoo designed in China about 1100 B.C. by the Emperor Wen Wang. The new plan has the effect of making the Zoo more garden-like by reducing evident buildings on the tiny site, where there are scarcely three usable acres. Public interest in the forthcoming new zoo has been immense, and cooperation from the Department of Parks has been exceptional.

The significance of this new direction in the Society's service to the public is indicated by the likelihood that its implementation would mean an annual attendance at Zoological Society-operated facilities approaching five million!

Six Malagasy radiated tortoises hatched at the Wildlife Survival Center were raised in the Zoo's Reptile House.

Animal Kingdom magazine

Since 1976, *Animal Kingdom* has expanded its circulation from 14,000 to 126,000. This has been accomplished by providing the magazine to other zoological societies and by tailoring it to their needs on an individual basis. Nevertheless, it has not grown enough to offset costs, and it is not yet paying its own way. An exceptional effort led by Editor-in-Chief Eugene Walter and Executive Editor Penny O'Prey,

Five generations of snow leopards, native to Central Asia, have been born and raised at the Bronx Zoo since 1966. Eight cubs were produced in 1980–81.

with the help of outside consultants, has been devoted to evaluating the prospects of increasing circulation. As the fiscal year ended, *Animal Kingdom* had been the subject of an in-depth subscriber study and of the development of a promising expansion plan. For the new year, the Board of Trustees has authorized a test mailing to measure its potential as a much bigger and more widely distributed national magazine.

Government Affairs Office

In January 1981, the Society created a totally new Government Affairs Office, headed by Kathleen Wilson (formerly Grants Coordinator). As a focal point for coordinating the Society's operations with the City, State, and Federal governments, it has already been effective in managing overlapping efforts by many departments in all the Society's divisions and in enhancing understanding by government officials of our programs and services.

In addition to areas of its operations covered in other reports, the office made special efforts to increase support from the Federal government, and despite the major cutbacks affecting nearly every agency, the Society received major new grants from the National Science Foundation for two curriculum development and teacher training programs; from the National Institute of Environmental Health Sciences for research into the accumulation of heavy metals by marine organisms; from the National Endowment for the Arts for the environmental planning and design research which contributed to the launching of Zoo Renaissance; and from the Institute of Museum Services for general operating support of the Bronx Zoo. This was also the year in which the Society completed its matching requirements for the Challenge Grant awarded by the NEA in 1979. The office collaborated with the American Association of Zoological Parks and Aquariums and the American Association of Museums in mounting support from zoos and other science museums to present the case for Federal support of our institutions.

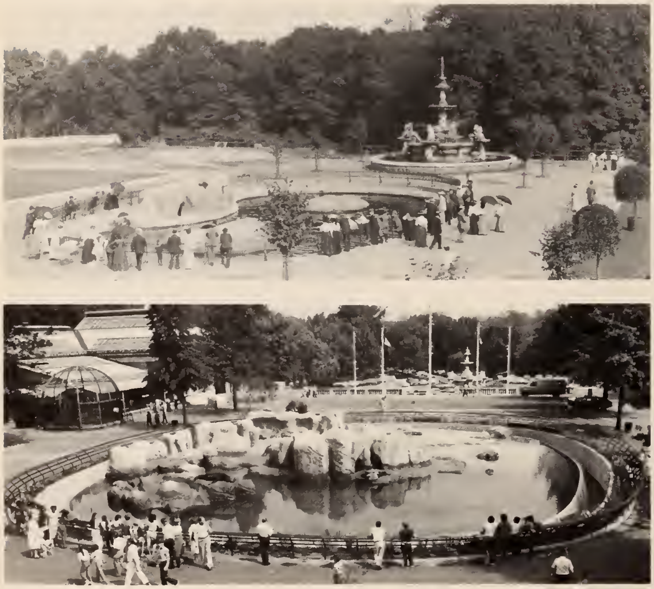
Organizational changes

Other significant organizational changes effected during the past eighteen months included consolidation of the Development, Membership, and Public Relations departments within a new division of Public Affairs under the directorship of

Gregory Long. It is anticipated that Mr. Long will be able to provide the same exceptional leadership in promotion, special events, and advertising that has characterized his administration of the development and membership programs. Elsewhere, the international conservation program of the Animal Research and Conservation Center was strengthened by the addition to its staff of Dr. Archie F. Carr, III as Assistant Director and Lynn Holstein as Development Associate.

The year and a half since the last Report ended with the Zoo and Aquarium amidst vigorous programs of renewal, with the animal collections propagating as never before, with membership at an all time high, and with strengthened efforts and encouraging progress in scientific research and conservation.

William Conway
General Director



The Sea Lion Pool on Baird Court as it appeared early in this century (top left) and the renovated Pool after its opening on June 18, 1981. Modeled on several rookeries in California, the new Sea Lion Pool provides a greatly enlarged and more naturalistic setting for the Zoo's six aquatic exhibitionists (right).

A Renaissance at the Zoo

A remarkable era of renewal is underway at the Bronx Zoo. Increased support from generous donors and from the City of New York, combined with carefully developed planning, has engendered a burst of restoration, renovation, and attractive new exhibitions that fully justifies the description, "Zoo Renaissance."

Completed during 1980–81 were the Nursery for fledgling birds in the World of Birds, special ramps for the handicapped at the Zoo's older buildings, remodeling of the cafeteria, a new and exceptionally attractive Sea Lion Pool on the site of the original 1906 pool, and an entirely new section in the Reptile House for amphibians and aquatic reptiles. Finally, the new and very popular Children's Zoo opened its gates.

Few efforts in public education and recreation could have been more thoroughly successful than the new Children's Zoo, which began operation in May 1981. It was made possible by the generosity of the Charles Hayden, Kresge, Louis Calder, and Surdna foundations, as well as by the Society's Women's Committee and several other donors. The exhibi-

Animal senses are the subject of the Desert habitat of the new Children's Zoo. The fennec fox hears many times better than human beings, as this young listener discovers.

tion complex broke new ground by presenting nature to city children in a compellingly attractive fashion. Children's Zoo-goers topped 247,000 in the first two months of operation, and more than 8,000 visitors have been recorded in a single day. A stream of visitors from other zoos assures that the idea of combining ecology, animal adaptations, natural environments, and participatory experiences with the more usual domestic animal petting areas will be widely and promptly emulated.

Work is far advanced on the remodeling of the 1899 Flying Cage, which will be reopened as the De Jur Aviary. It will become a walk-through exhibition of penguins, terns, gulls, and cormorants: an active, breeding sea bird colony. Just as near completion is an entirely new building, temporarily burdened by the name "Rare Large Mammal Building," for the Zoo's fine herds of Baringo giraffes and Grevy's zebras—and a hoped for group of okapis. The new structure will entirely replace the antiquated Antelope House constructed at the turn of the century. Most dramatic of the new exhibitions now under construction is Jungle World in Wild Asia, the largest structure with the most extensive indoor habitats we have ever attempted. Planned to exhibit such fascinating animals as Komodo dragons and giant gharials, gibbons and hornbills, proboscis monkeys and lion-tailed macaques, its completion has been delayed by contracting problems. Much less visible but no less important are projects underway to make the Zoo's buildings more energy-efficient. In addition to insulation improvements and heat management programs, studies are already underway concerning the potential of solar collectors, of using Zoo wastes as fuel, and even of harnessing the Bronx River to generate electric power. In the planning stages are new approaches to the Zoo's basic public circulation pattern and its directional and interpretive signage.

Zoo Renaissance is aimed at reinforcing the educational synthesis implied in the development of zoogeographic areas such as Wild Asia and Africa and the interpretive analysis set forth by special exhibitions such as the World of Darkness and the World of Birds. The idea is to make the Zoo even more coherent and enjoyable for the visitor by giving all its components a stronger feeling of place and identity. We want to better provide both for the Zoo-goer's creature comforts and for his understanding of the institution's mission—at the

Stanley Simon, Bronx Borough President, and Allison Smith, Broadway's "Annie," cut the ribbon at the opening celebration of the new Children's Zoo.

same time better providing for the Zoo-creature's creature comforts and for its long-term propagation and survival.

Outstanding among the Renaissance projects are two of especially pressing priority: a totally new animal hospital and the renewal of Baird Court. The new hospital will replace a sadly inadequate 1916 building and be located near the Zoo's border, where it is isolated from the center of activity and can better service the City zoos when they are added to the Society's responsibilities. Its planning is underway, and significant City support seems probable.

No project is more important to the Zoo's renewal than the revitalization of the six buildings of the central court. Today, the magnificent old Elephant House and Bird House are closed while awaiting renovation, and already a City capital budget project is providing for the restoration of their handsome exterior sculpture and beaux-arts brickwork. The court has been called "one of New York's finest public spaces," and its unique character and handsome buildings are an asset unmatched in any other American zoological park. The opportunity for their creative re-use is the single most stimulating element in the Zoo's Renaissance. **W.C.**

Strategies for survival

During 1980, two rather grim assessments of the present and future status of life on this planet were published. The *World Conservation Strategy*, prepared by the International Union for Conservation of Nature and Natural Resources, offers a comprehensive plan for saving and restoring ecosystems throughout the world while preserving the genetic diversity that is threatened by our headlong mode of development. *Global 2000*, a presidential report produced by the United States Council on Environmental Quality and the State Department, adds consideration of the question of population growth and control in its projection of world environmental conditions in the year 2000.

In dealing with this crisis, the role played by zoological parks and wildlife preserves is crucial. Ideally, species should be protected and maintained in natural ecosystems, but for many it is already too late. Due largely to the ruination of their unique environments by man, some species, especially among the larger mammals, now exist exclusively in zoos and preserves. Many have been lost forever; others, on the brink of extinction, have a spark of hope in long-range propagation programs that depend on the cooperation of zoos throughout the world.

Captive propagation

Both the problem and its possible remedies are reflected in the Mammalogy Department's collection of more than 130 species, forty percent of which are threatened with extinction in the wild in the near future. The goal is not simply to keep specimens alive, but to have them breed in successive generations without losing genetic diversity by inbreeding. Fortunately, the effort to attain this goal has been accompanied in recent years by an accelerating knowledge and understanding of captive propagation and animal management and an increasing emphasis on zoo interchanges that will ensure the constant infusion of new blood.

Of the forty-nine threatened species of mammals in the Bronx Zoo, twenty produced offspring in 1980–81. Some of them represent continuations of old, if qualified, success stories, last-ditch efforts to save species that have disappeared in the wild. The Père David's deer and Mongolian wild horses on the Rare Animals Range, both saved from total extinction around the turn of the century, have been breeding at the Zoo for many years. In 1980–81, seventeen Père David's were born, bringing the total offspring since 1946 to nearly eighty, while the Mongolian wild horses produced four new foals for a total of fourteen since 1968. Wild Asia, opened in 1977, has proved a particularly fertile breeding ground for threatened species, including the Siberian tiger (four cubs in 1980–81), the Eld's deer (three fawns), the Barasingha deer (sixteen fawns), and the Formosan sika deer (twenty-two fawns), which has been extinct in nature since 1973.

Leopards, bears, gaurs, and gorillas

The necessity of zoo breeding has led to an increasing sophistication in considering the distinctive reproductive conditions required by individual species in artifically created habitats. Successful propagation among the snow leopards over the past several years, for instance, is attributed to selective breeding and improved animal management, including the use of secluded birthing dens monitored by closed-circuit television, which affords the pregnant female privacy and security while allowing around-the-clock observation by the staff. In 1980 and 1981, eight snow leopard cubs were born and raised in the Carnivore House, bringing the total progeny to eighteen over the past twelve years. One female (born in the Bronx in 1975) produced her fourth litter in four years, all of which have been successfully reared. This year, one cub born in the Bronx represents five generations of captive breeding for this highly endangered species.

Polar bears also require privacy for breeding, and the Zoo had provided this for some time by reducing the number of animals and therefore the tensions among them, and by establishing heated cubbing dens near their naturalistic Big Bear exhibition. To date three cubs have been born and raised, including Snowflake, who made her public debut on April 11, 1981.

Even more dramatic techniques are developing in connection with the rare and endangered gaur of India, Burma, and the Malay Peninsula, which has been successfully breeding in the Bronx since Wild Asia opened four years ago. This spectacular bovid, largest of the wild cattle, has rapidly been pushed to the brink of extinction by habitat loss and exposure to diseases introduced by domestic livestock throughout its native range. During the last year and a half, five calves were born. In order to increase the reproductive potential of this herd, the Mammalogy and Animal Health departments worked together on the first attempt ever to super-ovulate a gaur and transfer its embryos into domestic Holstein cows for gestation and birth. (Details of the procedure are more fully discussed in the Animal Health report).

Indian fruit bats are the largest of the seven species of bats in the World of Darkness, which were recently subjected to the most accurate census ever.

The birth of two baby gorillas, Julia and Kelele, illustrates the importance of inter-zoo cooperation. Due to the small number of breeding individuals in this country, it is imperative that the gorilla gene pool incorporate as many specimens as possible. Julia, the first female sired by a Bronx Zoo gorilla, was born at the Los Angeles Zoo in early 1980. The father, Chuma, is on loan to that zoo, where he is housed with four females, all capable of producing young. Kelele, a male born here, was sired by Bendera. The mother is Holoki, on loan from the Philadelphia Zoo. Due to the rarity of the species and the fragility of the infants, the two babies are now being raised together in the Great Apes House by human surrogates and will eventually be integrated into larger social groups or become the nucleus of a new group. Cooperative programs such as these are essential if these gentle giants of the forest are to survive in captivity.

Bettongs and bats

A status report on the wild population of the pen-tailed bettong (*Bettongia penicillata*), a rabbit-sized kangaroo, has been completed by field scientists in Australia and indicates that this species may be near extinction. The Bronx Zoo has one of the largest captive populations in the world, an extremely important group if the animal is to remain extant. In order to better assess the world's captive bettong population, the Zoo has petitioned for the establishment of an international studbook to be maintained at the Zoo itself. Plans to bring new blood into the Bronx collection have already resulted in an exchange of young males with the Antwerp Zoo in Belgium. Additional facilities for keeping and breeding this unusual and rapidly diminishing species are being constructed off-exhibit.

The fruit and nectar-feeding bat colonies in the World of Darkness were also the subjects of a census, the most complete in eleven years. The seven species and more than 450 individuals represent the largest and most diverse captive collection in the world. Controlled light cycles and naturalistic exhibits have resulted in ever-increasing colonies. In the Tropical Forest exhibition, the original colony of 130 fruit and nectar bats collected in Trinidad in 1969 has increased to over 425 individuals. Breeding pairs of Indian fruit bats, one of the world's largest bats, with a wingspan of up to five feet, have produced six young in a similar time period; and the African hammer-headed bats in the flight exhibit (the only collection in captivity) have given birth to twenty offspring since 1973.

Construction and renovation

Several mammal exhibitions are undergoing transformations as part of the Renaissance program that will eventually bring the entire Zoo into a new era of animal conservation and exhibition. Already completed, and opened on June 18, 1981, is the new Sea Lion Pool on Baird Court, which is modeled on West Coast sea lion rookeries, complete with an artificial coastal cliff, a pebbly beach, a tidal pool, and a much enlarged main pool. More than twice the size of the antiquated 1906 pool it replaces, the new habitat can accommodate up to ten animals. Residing there now are Moose, the 693 pound male; Laverne, a mature female; and four pups that were rescued on the California coast last year. The pool is once again a major attraction that provides a spectacular and educational exhibition for the visitor as well as a naturalistic site for maintaining and breeding these frolicking pinnipeds.

The construction of the Rare Large Mammal Building is nearing completion, and the exhibition is scheduled for opening in the spring of 1982. This building, replacing the old Antelope House, was made possible by generous gifts from Mr. and Mrs. James Walter Carter and will house herds of Baringo giraffes, Grevy's zebras, bongo antelope, or possibly okapi, against a background of scenic murals of African landscapes. During the warmer weather the animals will range over the carefully landscaped four-acre area adjacent to the building.

On a much smaller scale are the exhibitions devoted to social groups of animals in the yards around the old Elephant House. New graphics have been designed for the capybaras, and an entirely new habitat has been created for the prairie dogs. These fascinating social rodents can now be viewed at close range with the help of educational graphics depicting many of the behavioral patterns the animals themselves display.

Mammal Census, Bronx Zoo (as of Dec. 31, 1980)

Order	Families	Species	Specimens
Marsupialia—Kangaroos, phalangers, etc.	3	5	51
Insectivora—Moles, shrews, hedgehogs, etc.	2	2	6
Chiroptera—Bats	3	9	476
Primates—Apes, monkeys, lemurs, marmosets, etc.	6	23	149
Edentata—Armadillos, sloths, anteaters	3	3	9
Rodentia—Squirrels, mice, porcupines, etc.	11	20	182
Carnivora—Bears, raccoons, cats, dogs, etc.	6	27	99
Pinnipedia—Seals, sea lions, etc.	2	2	4
Proboscidae—Elephants	2	2	8
Perissodactyla—Horses, tapirs, rhinoceroses	3	6	37
Artiodactyla—Cattle, sheep, antelope, etc.	8	32	521
Totals	**49**	**131**	**1542**

N.B. Totals include sixty-three specimens on loan to other collections from the NYZS, and thirty-six on loan to the NYZS from other collections.

These Siberian tiger quadruplets are the subject of great public attention and of one of the Zoo's most popular posters.

Condors and cranes

One of the major goals of zoo management, beyond captive propagation and exhibition, is to reverse the depletion of species by reintroducing those that have lost their foothold in nature back into their original habitats. A dramatic and successful experiment in reintroduction, involving the Andean condor, was recently carried out by the Ornithology Department in concert with other institutions. The project may serve as a model for saving the embattled California condor in its own ecosystem, if indeed the ecosystem itself can be saved.

The program began with the hatching of four Andean condor chicks, two from eggs produced by birds in the Bronx Zoo, and two from eggs sent to New York by the Miami Zoo. The egg-laying process itself, which happens only once every two to four years with condors in the wild, was speeded up by removing the egg from the mother when it was laid so that she would then produce another in its place. Once the chicks emerged, they were fed by keepers using life-size hand-puppets of mature condor heads so that they would not associate food with humans and therefore be unable to survive in the wild. In August 1980, before they could fly, three chicks were taken by Curator Donald Bruning to a site in northwestern Peru where they continued to be fed in secluded chambers, still unaware of human presence, until in early 1981 they were released by a team from the University of Wisconsin. These young, formerly captive birds are now flying and feeding with wild condors. Outfitted with tiny radio transmitters, they are kept under careful surveillance.

Crane breeding, an equally high priority due to the rapidly decreasing numbers of most species, has also undergone several new developments. The Zoo itself has hatched seven white-naped cranes and five hooded cranes over the past year and a half, while the Wildlife Survival Center on St. Catherine's Island in Georgia produced wattled, sarus, sandhill, and Stanley cranes early in 1981. The loss of one of our two breeding male white-naped cranes reduced production of this species in the past year, but a new wild male has already been located for next season. Intensive efforts to increase exchanges with other zoos in order to improve genetic diversity included the shipment of a young pair to Okskiy Reserve and a male to the Moscow Zoo in the Soviet Union for breeding.

Much of the research for artificial insemination and semen freezing being conducted by Assistant Curator Christine Sheppard and Medicine Resident Janet Stover is focused on widening the possibilities of crane breeding. Jungle fowl have been successfully reproduced this way, and we are now approaching the time, despite the particular difficulties connected with cranes, when these techniques will be extensively used. The problem of rearing crane chicks, which often attack each other in their first three or four months, should be eased with the completion of a new facility that will allow them more space to achieve maturity in isolation.

New acquisitions

The expense of tracking down birds in the wild, and government agricultural restrictions designed primarily to prevent the importation of diseased chickens, continue to limit the acquisition of wild birds for the collection. Still, a number of important specimens were obtained on expedition as well as by donation or by loan or trade from other zoos and propagators. In September 1980 a pair of Congo peacocks arrived on loan from the Antwerp Zoo. This is the only pair of these birds in North America, and they are already well established in the African Rain Forest exhibition, where they have started producing eggs.

An expedition to Jamaica by Christine Sheppard and Supervisor Gus Waltz resulted in the capture of ten female Jamaican red-billed streamer-tailed hummingbirds for bachelor males at the Bronx and Philadelphia zoos and the Brookfield Zoo in Chicago. A pair of these living jewels is now courting in the South American Rain Forest exhibition at the World of Birds. Other pairs will be housed in special quarters designed for controlled breeding that are being readied in Propagation One, the non-public facility behind World of Birds which provides for the maintenance of large breeding groups and problem breeders.

Other acquisitions include a group of waterfowl donated to the Society by Ornithology Field Associate William Macy, and a group of nocturnal and greater curassows from the Houston Zoo. The nocturnals are on exhibit in the South American Rain Forest, while the greaters are already producing young on St. Catherine's Island.

Hatched at the Zoo

Nearly 400 birds have been reared at the Zoo since the end of 1979. The Malayan wreathed hornbill hatched and reared chicks once again in 1980 and 1981. Flamingos, Inca terns, Palawan and Malayan peacock pheasants, green wood-hoopoes, tawny frogmouths, black-breasted hemipodes, and shama thrush continued to breed successfully.

Perhaps the most satisfying hatching was from a pair of highly endangered North American trumpeter swans, who finally reached breeding age and produced a chick in May 1981.

The first trumpeter swan ever hatched at the Bronx Zoo serenely ignores an adult confrontation.

New and renewed exhibitions

Three exhibition sites underwent varying degrees of change and improvement in 1980–81. At the Lila Acheson Wallace World of Birds, the brooder room was given new, enlarged quarters and opened to the public in spring 1980. Although a few chicks have always been displayed to the public, it is now possible to show all the activities connected with rearing, feeding, and various other stages of hand-raising as they are actually carried out by the staff. The expanded facility also affords greater flexibility and the potential to explore new rearing techniques.

Several changes have been made at the Aquatic Bird House, with the acquisition of a hammerheaded stork and the return of the boatbilled herons to their former "Treetops" home. The James and Andean flamingos were sent to the Wildfowl Trust in England where they joined larger flocks, which should increase their breeding potential. The lesser flamingos, which hatched a chick for the first time last year, were sent to Seaworld in Florida to become part of a larger breeding group, and the Flamingo Lagoon exhibition was redone as a tropical mangrove lagoon for our flock of scarlet ibis.

At the old Flying Cage, originally built in 1899, all City-financed work and repair has been completed. Most of the artificial rock-work is now in place for the interior exhibition, which has been redesigned with funds from the Harry De Jur Foundation as a naturalistic setting for gulls, terns, cormorants, penguins, and other sea and shore birds. The birds will be in by the fall and the official opening of the 152-foot-long by 55-foot-wide structure as the De Jur Aviary is scheduled for the spring of 1982.

Research and development

In addition to work toward improving procedures concerning artificial insemination, semen freezing, incubation, and diet, new methods for determining sex by laparoscopy, a microscopic surgical technique used in human medicine, have facilitated the pairing of birds, practically eliminating guesswork. Among the first young produced when mispaired birds were rematched correctly with members of the opposite sex were two Lady Ross's violet touracos and two lilac-breasted rollers. Through such projects, as well as the teaching activities of the curators at Fordham University and the program of graduate volunteers, basic research in behavior, propagation, and conservation is assuming an increasingly important role in the future direction of the department.

Bird Census, Bronx Zoo (as of Dec. 31, 1980)

Order	Families	Species	Specimens
Struthioniformes—Ostriches	1	1	1
Rheiformes—Rheas	1	1	9
Casuariiformes—Cassowaries, emu	2	2	6
Tinamiformes—Tinamous	1	2	6
Sphenisciformes—Penguins	1	3	15
Pelecaniformes—Pelicans, cormorants, etc.	2	4	18
Ciconiiformes—Herons, ibis, storks, flamingos, etc.	4	18	108
Anseriformes—Swans, ducks, geese, screamers	2	54	287 +
Falconiformes—Vultures, hawks, eagles	4	9	31
Galliformes—Quail, pheasant, etc.	3	21	203
Gruiformes—Hemipodes, cranes, rails, etc.	5	18	122
Charadriiformes—Plovers, sandpipers, gulls, etc.	9	27	142 +
Columbiformes—Pigeons, doves	1	5	12
Psittaciformes—Parrots, etc.	1	15	36
Cuculiformes—Touracos, cuckoos	2	8	26
Strigiformes—Owls	2	9	21
Caprimulgiformes—Frogmouths, etc.	1	1	15
Apodiformes—Hummingbirds, etc.	1	3	7
Coliiformes—Colies	1	1	3
Coraciiformes—Kingfishers, hornbills, etc.	5	10	39
Piciformes—Barbets, toucans, woodpeckers	2	6	15
Passeriformes—Perching birds	20	69	247
Totals	**71**	**287**	**1369 +**

N.B. Totals include ninety-five specimens on loan to other collections from the NYZS, and forty on loan to the NYZS from other collections.

Andean condors that were fed at the Zoo by keepers wearing hand-puppets now hold their own with wild condors in Peru.

Changes at the Reptile House

Originally built in 1899 and renovated in 1954 and 1969, the Reptile House underwent further changes in 1980 as part of the Zoo Renaissance program, mostly in the areas of amphibians and aquatic reptiles. These developments were made possible by generous gifts from the Griffis Foundation.

Three of the new displays are devoted primarily to frogs. One traces the life cycle of the bullfrog from amplexus to maturity, the second identifies the distinctive sounds made by various species of local amphibians, and the third shows some very unusual terrestrial and aquatic amphibians from around the world, including a tiger salamander, an Asiatic horned frog, a beautiful treefrog, and a Surinam toad. All are accompanied by highly evocative and descriptive graphics.

The three new exhibitions featuring aquatic reptiles re-create their farflung natural habitats. Denizens of the Northeast Pond contains water snakes, stinkpots, painted turtles, largemouth bass, and bluegill sunfish. The Elephant Trunk Snake from Southeast Asia displays that amphibious species, and Poisonous Sea Snakes features the yellow-lipped sea krait from Fiji.

Also added in the past year and a half were displays for two Venezuelan reptiles—four specimens of the Uracoan rattlesnake and three of the fast-moving aqua-colored ameiva lizard. Four Siamese crocodiles began to nest almost immediately after taking up residence in the large enclosure formerly occupied by Cuban alligators.

The goliath frog

Expeditions in 1979 and 1980 led to the acquisition of Lake Titicaca frogs in Bolivia and the yellow-lipped sea krait in Fiji. In April 1981, Herpetology Curator John Behler led another successful expediton, this time to the rain forest rivers of Cameroon, equatorial west Africa, to collect specimens of the goliath frog, the world's largest anuran. The three-week trip was partially funded by the Griffis Foundation and conducted in conjunction with members of the University of Oklahoma's zoology department, who focused on the physiological ecology of several species of amphibians in the area.

Goliath frogs have been known to reach a weight of more than seven pounds (with unverified reports of up to thirteen pounds), and an overall length of more than thirty-one inches. The eight specimens collected by Behler are now displayed in a carefully re-created habitat in the Aquatic Bird House's Jungle Stream, a lushly planted enclosure with natural light and highly oxygenated water cascading in a series of small waterfalls.

Captive breeding

As in the past, the great majority of additions to the collection were the result of breeding efforts. In the eighteen months since January 1, 1980, a total of 259 crocodilians, turtles, snakes, and lizards were hatched or born, with eighteen species successfully reproducing.

The most notable additons were nine elongated tortoises, which bred for the first time ever, three Yacare caimans from eggs laid in the World of Darkness and hatched at the Reptile House, ten indigo snakes, and an Australian desert skink. The Muhlenberg's turtles bred for the eighth consecutive year, producing six offspring, and twenty-one youngsters hatched in the Society's cooperative Chinese alligator propagation program at the Rockefeller Wildlife Refuge in Louisiana. It was the second time that this most critically endangered crocodilian, represented here by the only breeding examples outside China, has reproduced in captivity.

Inter-zoo exchanges, gifts, and loans

Largely as a result of these breeding successes, the Department was able to present 183 animals to thirty-three other zoological parks around the globe where they will be displayed and bred. Twenty-three baby Hispaniolan boas were sent to the Dominican Republic to be released into the wild in the vicinity where their parents were originally collected. Twelve adult yellow-spotted Amazon sideneck turtles were loaned to the Honolulu Zoo, the Jacksonville Zoo, and Seattle's Woodland Park Zoo, all of which have established special breeding programs for this endangered chelonian. Finally, our large female black caiman was sent to the Oklahoma City Zoo, and the three young males went to the Miami Zoo, where efforts to reproduce this vanishing species have begun.

The department also received a number of important specimens from other zoos. Two huge Aldabra tortoises were loaned by Busch Gardens in Tampa. The Dallas Zoo sent unusual ornate palm vipers, black-headed pythons, Uracoan rattlesnakes, and hatching Coahuilan box turtles. Two Australian taipans were received from the San Diego Zoo and two female Chinese alligators from the Budapest Zoo in Hungary. Other additions to the collection include a female Fly River turtle (the Zoo's single male arrived in 1958 and is a very popular exhibit) and a male giant Amazon sideneck turtle, which is currently displayed with seven females in the Riverbank exhibition.

Reptile and Amphibian Census, Bronx Zoo (as of Dec. 31, 1980)

Class	Order	Families	Species	Specimens
Amphibia	Caudata—Salamanders	1	5	12
	Salientia—Frogs, toads	5	12	45
Totals		**6**	**17**	**57**
Reptilia	Testudinata—Turtles	9	33	181
	Crocodilia—Alligators, caimans, crocodiles	2	12	82
	Squamata			
	Sauria—Lizards	8	14	57
	Serpentes—Snakes	6	58	300
Totals		**25**	**117**	**620**

N.B. Totals include eighty-two specimens on loan to other collections from the NYZS, and fifty-two on loan to the NYZS from other collections.

A group of rare Malagasy radiated tortoises has been breeding successfully at the Wildlife Survival Center and recently produced several offspring that were later transferred to the Zoo's Reptile House Nursery.

John Behler, Curator of Herpetology, holds one of the eighteen goliath frogs he collected in Cameroon, equatorial west Africa, on a joint expedition with the University of Oklahoma.

In 1974, the Edward John Noble Foundation offered the use of St. Catherine's Island, off the coast of Georgia, for the establishment of the Wildlife Survival Center. This refuge provided the space to maintain large breeding populations of endangered species—particularly antelopes and other grazing animals, marsupials, and birds—in a natural setting that does not require the development of public facilities necessary to the Bronx Zoo. After seven successful years of acquiring and propagating rare species, the Center hopes to double or triple in land area by 1982, with possible expansion to 1,000 acres of the island's 22,000 acres by the mid-1980s.

Bird breeding

The most extensive developments of 1980–81 involved the growing bird collection. There were seventy-three hatchings in the first half of 1981 alone, compared to a previous production of only a few eggs per year. Part of this increase can be attributed to the success of a new surgical method for determining sex (laparoscopy), which facilitates the correct pairing of male and female.

Cranes are among the priorities of the Center, as they are at the Zoo itself, and breeding efforts continued to be rewarding. Eight fertile eggs were produced by a single pair of wattled cranes. Predators reduced the number that could be reared to maturity to only two chicks, but the new facility should expand the capability for raising these rare birds in the future. Paradise, sarus, and sandhill crane chicks were also reared successfully.

There are promising indications that parrot breeding at the Center may soon be on a par with crane breeding. Six chicks were produced by one pair of Leadbeater's cockatoos and several eggs by another. Eggs were also laid by the grand eclectus parrot and courtship is proceeding between two newly-paired macaws.

Most exciting of all, however, were four eggs laid by our groups of maleos, ground-dwelling birds from Australia. Maleos are uncommon in the wild and almost unknown in captivity. Part of the megapode family, they incubate their eggs by burying them in the sand. A student intern working on the island may have been the first human to have actually witnessed egg-laying in this species. Another fowl-like bird, the nocturnal curassow from South America, hatched five chicks and has more eggs in the incubator.

Mammals and reptiles

The antelope collection at the Wildlife Survival Center continued to grow, to the point that it was possible in 1981 to sell sizeable groups of addax and gembok born on St. Catherine's to outside breeders. Most important, however, among the forty-one mammals born and raised in 1980–81 were the first two Grevy's zebras. This species, greatly reduced in numbers because of poaching, is restricted to a small area in northern Kenya. With these two births, we hope to have the foundation for a badly needed breeding program devoted to the largest of the zebras.

One new mammalian species was added to the Center's collection in May 1980, when a group of eight Parma wallabies arrived from the Bronx Zoo. This small and endangered kangaroo-like marsupial, once thought extinct, seems to have reached its present depleted status since the arrival of the first Europeans and the introduction of domestic animals in its native Australia.

Early in 1981, the Center's breeding group of the endangered Malagasy radiated tortoise produced eggs. Six of these hatched young, some of which can now be seen in the Reptile House Nursery at the Bronx Zoo. The achievement is especially noteworthy, since only one other program, at the Gladys Porter Zoo in Brownsville, Texas, has established a significant breeding effort for this species in the western hemisphere.

Research projects

Because some species are present in significant numbers and varied age groups, the Center's collection offers great potential for biological and behavioral research. One study, being continued by Dr. Terry Maple of the Georgia Institute of Technology, concerns the behavior of antelopes. Another, recently begun by Dr. Janet Stover, Medicine Resident in the Society's Animal Health Department, and John Lukas, Associate Curator of the Wildlife Survival Center, is the first of what we hope will be many studies in the area of reproductive biology. The purpose of this research is to explore the possibility of transferring the embryo of an Arabian oryx, a critically endangered species, into a gemsbok for gestation, an operation similar to the gaur transfer conducted at the Zoo by Dr. Stover and the Mammalogy Department. Before this step can be taken, however, it is necessary to know the reproductive (estrous) cycle of the female gemsbok and to be able to regulate it.

Wildlife Survival Center Census (as of Dec. 31, 1980)

Class	Order	Families	Species	Specimens
Aves	Anseriformes—Geese	1	1	6
	Galliformes—Pheasants	2	2	6
	Gruiformes—Cranes, bustards	2	6	34
	Psittaciformes—Parrots	1	5	15
Totals		**6**	**14**	**61**
Mammalia	Marsupialia—Kangaroos	1	2	16
	Perissodactyla—Zebras	1	1	9
	Artiodactyla—Antelope	1	7	129
Totals		**3**	**10**	**154**
Reptilia	Testudinata—Tortoises	1	2	20

N.B. Totals include two specimens on loan to other collections from the NYZS, and forty-seven on loan to the NYZS from other collections.

Staff appointments

Alfred Valenzuela, former Supervisor of Birds at the Houston Zoo, joined the staff of the Wildlife Survival Center in 1980 as Assistant Curator. Although only recently arrived, he is already deeply involved in the bird and tortoise breeding programs.

An intern program has been initiated for the summer of 1981 with the hope that it will continue on a regular basis in future summers. Chosen this year are two enthusiastic young women, Susan Kopp and Lisa Antinoph, both of whom had previously worked at the Bronx Zoo. Their duties at the Center include caring for the animal collection and carrying out special projects under the guidance of the curatorial staff.

Sarus cranes were among the several endangered species of cranes that reproduced at the Wildlife Survival Center and at the Bronx Zoo.

Although most of the Animal Health Department's visible activities relate to disease treatment and research, perhaps its most important function lies in preventive medicine and the elimination of medical intervention. One basic aspect of this approach is the operation of a commissary that provides a million and a half pounds of food a year for the animals at the Bronx Zoo. Another is captive management, which involves close consultation between curator and veterinarian in matters pertaining to animal social structure, herd size, and environmental conditions. Since treatment itself is alien to animals in the wild, the idea is to forestall the necessity for it through constant surveillance and periodic examinations, and to effect it, when necessary, without drastically disrupting the animal's living situation in captivity.

Plans for a new hospital

The resources of an animal hospital are, nonetheless, essential, not only for animal treatment, but also for the administration of medical tests and for clinical research. When the New York Zoological Society's first veterinarian, Dr. Reid Blair, established the country's earliest zoological animal hospital in 1914, he could not have known that this facility would be required to fulfill the needs of the Zoo for over sixty-six years. With the increasing complexity of the Society's goals, the urgent efforts to preserve and propagate rare species, the modernizing of zoo management and animal care, and the rapid expansion of research and field studies, the planning and construction of a new animal hospital at the Bronx Zoo has become a leading priority.

A preliminary architectural design has already been proposed and a site surveyed near the service gate. The City of New York is expected to provide major support for the new hospital, although significant private funding will be needed to meet the total cost of construction. The new building will be four times larger than the old in order to accommodate the expanded needs of the department. Much of the increased area will be devoted to space for more versatile and flexible animal handling; new laboratories for research in reproductive physiology, virology, and cytogenetics; and totally modernized facilities for surgery and pathology. Finally, as the Society takes over the operation of the Central Park, Prospect Park, and Flushing Meadows zoos, the new hospital will have the added responsibility of acting as a regional center, with the other zoos maintaining only emergency animal care services.

Gaur transfer

In an effort to accelerate the reproduction of rare species, the Animal Health and Animal departments have increasingly concentrated their attention on reproductive physiology and on procedures that have been developed in university laboratories and used in livestock production for some time. In 1980, Janet Stover, Medicine Resident, and Christine Sheppard, Assistant Curator of Ornithology, were awarded two-year career development grants by the Muskiwinni Foundation to pursue their work in this area. In one project they are working together to develop techniques for the artificial insemination of some avian species.

More dramatic, perhaps, is Dr. Stover's collaboration with the Mammalogy Department in the Zoo's first attempt at embryo transfer. The experiment involves the gaur of Southeast Asia, the largest and one of the rarest of the world's wild cattle, fifteen of which are in the Bronx Zoo's breeding herds. The gaur cow was first superovulated, using hormones to produce five ova rather than the normal one. Dr. James Evans of the University of Pennsylvania then flushed these ova, after they had been fertilized by a bull, from the uterus of the gaur and placed them in Holstein dairy cows that were in the same stage of the reproductive cycle as the gaur cow. Three of the Holstein cows became pregnant after the embryo transfer in October 1980 and two are expected to give birth to gaur calves in July or August of 1981. (*Before this report went to press, on August 11, a gaur calf, named Manhar, was born to the Holstein cow, Flossie.*—Ed.)

Research grants and health projects

A research collaboration between the Population Council of Rockefeller University and the New York Zoological Society has been made possible by a grant from the Jessie Smith Noyes Foundation. Under this grant two post-doctoral fellows will study reproductive physiology and endocrinology, and it is hoped that this association will be fruitful in developing the scientific insights necessary to preserve certain species from extinction.

Alternative methods of sexing monomorphic birds, whose sex cannot be determined externally, is the subject of research supported by a grant from the Eppley Foundation. Veterinarian Dr. Emil Dolensek and microbiologist Dr. Raymond Napolitano hope to develop non-hormonal, non-surgical methods from gender-specific molecules (antigens) on the surface of white blood cell types. A successful conclusion to this research could facilitate the captive propagation of a wide variety of birds and reptiles.

Investigation into the concentration of lead in zoo animals has been continued by Dr. Gene Passer of the Bronx Community College under a grant from the National Institutes of Health. Studies to date indicate a lower level of lead in most animals than was observed in a brief survey conducted ten years ago. If completed research supports this conclusion, it may indicate an improved environment for all residents of New York City.

Two dietary problems affecting Zoo animals have finally been resolved. It was found that a post-hatching disease in the chicks of some birds was related to vitamin E deficiency or to early septicemia and could be controlled either by vitamin E supplementation or by the prompt administration of appropriate antibiotics. In the blesbok antelope, a copper deficiency was diagnosed through a survey of copper levels in serum. Dr. Paul Cheung of the Osborn Laboratories of Marine Sciences cooperated with the Animal Health Department in performing the copper analysis. Proper supplementation in the food for this species has resulted in a miraculous improvement in the herd's condition.

Field studies

The Animal Health Department conducted two field studies during 1980–81 in conjunction with expeditions undertaken by the Society on opposite sides of the world. Early in 1980, Dr. Dolensek accompanied an expedition to the Florida Keys, headed by Trustee Nixon Griffis, which collected a variety of shark species for exhibition in the Aquarium's new shark tank. The gathering of information concerning physiological changes during capture and shipment will be invaluable in maintaining and caring for the sharks in captivity.

In March and April of 1981, the Department took part in the giant panda field study being conducted by George Schaller, Director of the Animal Research and Conservation Center, who required assistance in the design of a captive management program. Dr. Stephen Seager, of the National Institutes of Health, and Dr. Dolensek cooperated with Chinese scientists in preparations for breeding with artificial insemination and in setting up nurseries for potential offspring at two sites in China. In the coming year, further study will be necessary to consistently maintain, breed, or rear this endangered species.

Embryo transfer from Southeast Asian gaur (above) to domestic cows, is one of the important experiments in captive propagation now being conducted at the Zoo.

The Zoo Education Department, established in 1929 and therefore the oldest in the country, underwent the most expansive growth in its history between January 1, 1980 and June 30, 1981. There were numerous new programs and publications. Sixteen new courses were added to the more than seventy offered to school groups and the general public. But the period was distinguished above all by two landmark achievements in zoo education: the completion and inauguration of the new Children's Zoo in May 1981, and the receipt of a major National Science Foundation grant in March 1981 to develop a prototype survival and conservation curriculum (Project W.I.Z.E., Wildlife Inquiry through Zoo Education) for use in junior high schools and zoos throughout the country.

The new Children's Zoo

When the old Children's Zoo opened in 1941, it was based on the innovative concept of bringing children into direct contact with animals, and the rather fanciful idea of relating their experience to nursery rhymes and stories. This became the accepted form for children's zoos, although the nursery rhyme theme gradually withered away over the years. The new Children's Zoo is the result of an entire renovation of that concept as well as the physical plant of the Zoo itself. In keeping with our awareness of ecology, the emphasis on domestic animals was replaced by a focus on wild animals, and by a recognition of the animals' total environment.

From one-third of an acre, the total area of the Children's Zoo has been expanded to nearly three acres in which all the habitats are indigenous except for the one devoted to the desert. A rustic walkway winds through four natural zones—woodland edge, marsh, forest, and desert—ending in the now updated domestic area that comprised the old Zoo, where children can still pet and feed goats, sheep, calves, rabbits, and other old favorites. In each zone, the exhibits are designed to illustrate one of four basic areas of animal adaptation—homes, locomotion, defenses, and senses. Educational graphics pose basic questions about animal behavior, and participatory exhibits relate the child's experience to that of the animals. The child is invited to sit in a bird's nest next to a real nest, pop up through a prairie dog's burrow alongside prairie dogs in their own burrows, crawl in a snail shell, escape like a lizard down a slide, climb on a spider's web, and hear as well as a fox hears with huge fox ears, all simulated in child-sized models. At the new Children's Theater in the domestic zone, demonstrations with live animals are given on a regular basis by members of the education staff to further enhance the educational value of the visit.

Attendance at the Children's Zoo has been exceptional. During the previous two seasons, admissions averaged 300,000 per year, while in only sixty-one days in 1981, the new facility admitted more than 247,000 visitors. It is the first children's zoo of its kind and is already serving as the model for a new approach by zoos throughout the world.

Each of the five zones of the new Children's Zoo represents both a type of habitat and of animal adaptation. The porcupine illustrates animal defenses in the Forest zone.

Project W.I.Z.E.
"Wildlife Inquiry through Zoo Education" will help establish, on a national level, the importance of zoos as serious educational centers. Funded by the Development in Science Education program of the National Science Foundation, the project will be developed by the Education Department staff, aided by advisory panels, curriculum consultants, and a consortium of zoos that includes Philadelphia, Topeka, and the Riverbanks Zoo in South Carolina.

The program will focus on the issue of wildlife survival in the twenty-first century in an innovative science curriculum designed for grades six through nine. It is composed of three modules that deal with the survival of a single animal, a single species, and an entire community or ecosystem. Each module will be structured as a nine-week instructional unit of forty-five hours to be taught in the classroom and at the zoo. The educational materials are to be developed so that they can be used in various kinds of zoo settings, geared to the facilities and animals that are available in most zoological parks.

Development of the prototype will take place over a three and a half year period, with thirty-three classes in four states pre-testing the materials in November 1981, and 120 classes in four states testing the final product. Ultimately, the program is intended for publication and national distribution to zoos and schools. This effort, initiated at and directed by the Bronx Zoo, represents an important breakthrough in the recognition of zoos as scientific-educational institutions, and in the priority given to the issues of conservation and survival which most specifically affect the young and future generations.

Although the new Children's Zoo stresses wildlife and natural habitats, this African goose and other domestic animals are still an important part of the visitor's experience.

In the Woodland Edge, as in the other four zones, children participate and learn by doing as the animals do. Prairie dog burrows demonstrate one type of animal home.

Organized group programs

"Windows on Wildlife," the forerunner of Project W.I.Z.E. in curriculum development, was supported for the third year by a grant from the Charles E. Culpeper Foundation. By June 1981 more than 4,000 fourth- through sixth-grade students and one hundred teachers had participated in this award-winning program, which concentrates on endangered species and our dwindling natural habitats, including wetlands, rain forests, deserts, grasslands, and deciduous forests.

This program combines classroom activities, for which the teacher prepares in workshops at the Zoo. Any combination of habitat units may be selected for study after fulfillment of the required section on endangered species. Printed materials (teacher information sheets, student activity sheets, stories and booklets about each habitat) are aimed at creating a better understanding and a more positive attitude toward the environment. The curriculum has been requested by seventeen libraries, four zoos, and fifteen other educational institutions in addition to several New York City school districts. The Education Department hopes to continue this grant-supported program on a self-supporting basis through the sale and distribution to schools of the curriculum and its associated materials.

An introduction to mammals, birds, and reptiles is provided by "Animal Discovery, " a mini-course in three one-hour sections that has been attended by more than 4,000 elementary school students in the metropolitan area, many of them through the federally funded Open City project, since January 1980. Out of this program has come Project ZIP ("Zoo Information Packs"), which will help fulfill the Department's goal of reaching most of the 300,000 school children who visit the Zoo annually. Funded by the William Randolph Hearst Foundation in April 1981, the program is now being pretested. These free educational publications will be available to teachers in 1983.

Another popular program on the elementary level is "Zoo Careers," inaugurated in fall 1979. Tours of the facilities, role-playing games, and talks about the work of curators, keepers, designers, and other staff members give both students and guidance counselors a behind-the-scenes glimpse of zoo operations as a very early introduction to selecting a career.

As in previous years, several special courses of study were created for gifted students. In spring 1980, a fifteen-session "Ecology and Animal Behavior" program was offered to sixth- and seventh-grade students under the sponsorship of Southern Westchester Board of Education Cooperative Services (BOCES). A modified ten-session version of this program was conducted for seventh- and eighth-grade students in fall 1980 and a similar course for elementary school students was given to a class from Bronx District 10 in spring 1981. The towns of Eastchester and Tuckahoe in Westchester County also sponsored a multiple-session program for their students on animal behavior, and the Bronx High School of Science is continuing its long-standing interest in animal studies, with a record registration of over ninety students engaged in research projects at the Zoo.

Special summer programs

During the summers of 1980 and 1981, four major programs for young people were conducted simultaneously in the course of ten weeks. In its fourth and fifth years of operation, "Animal Kingdom Zoo Camp," a five-day adventure with visits to the African, Asian, South American, and North American exhibits, and one day spent as a keeper in the Children's Zoo, had a registration of nearly 600 eight- through twelve-year-old campers.

"Animals Around the World," a four-day pre-school version of Zoo Camp, was introduced in summer 1980. Special puppet characters introduce each day's activities at various exhibits and the entire program culminates with an animal costume party.

"Summer Animal Care and Management Internship," an intensive four-week course for teenagers, was offered for the second and third summers in 1980 and 1981. The program prepares prospective candidates for animal-related careers with 135 hours of on-the-job training in the theoretical and practical aspects of captive animal management. Along similar lines, Columbus High School in the Bronx participated in a fifteen-session occupational training program that involved seventy-five students from six high schools. This exemplary collaboration between the Zoo and the local community was supported by a grant from the Avon Foundation.

The fourth major summer program, "Junior Zoo Designers," was introduced in 1981 as an outgrowth of an aspect of the Animal Care course. Part of the Hunter College Program for gifted youth, it focuses on the unique problems associated with designing exhibits suited to captive animal propagation and visitor education.

Adult education

Although there has been a tremendous growth in programs designed for children and organized school groups, more than half of the courses and classes offered by the department are directed to adults, some for college students, others for a general audience. Several of these are special courses arranged for credit with colleges and teacher groups in the New York area. Early in 1980 a ten-hour course on endangered species was given to graduate students in the CCNY environmental education program. The success of this Zoo-based course, which resulted in a number of interesting audio-visual projects, encouraged us to pursue a similar program with New York University. In the fall of 1980, a twelve-hour course entitled "The Role of the Modern Zoo" was taught to participants in the University's continuing education program. Endangered species is the subject of a fifteen-week, one credit course for teachers that emphasizes application to the classroom curriculum.

New titles among the general audience classes included "Tropical Animals . . . Will They Survive?", "Primates and the Evolution of Man," and three guest lectures by members of the curatorial staff. "Wildlife Photography in the Great Outdoors" and more sessions for the other photography courses have been added to satisfy the increasing demand for animal photography instruction.

Other activities

In additon to courses, printed materials, and the Children's Zoo, the Education Department is responsible for the narrative scripts used on the motorized tours, the free animal behavior demonstration in Wild Asia called Wildlife Theater, and the llama, camel, pony, and elephant rides that attracted almost 300,000 children and adults over the past eighteen months. The educational philosophy is the same in these as in other activities: to provide experiential learning through contact with animals.

Children's Zoo Census, Bronx Zoo (as of Dec. 31, 1980)

Class	Order	Families	Species	Specimens
Aves	Ciconiiformes—Herons	2	2	3
	Anseriformes—Ducks, geese	1	1	1
	Falconiformes—Falcons	1	1	2
	Columbiformes—Doves	1	1	1
	Psittaciformes—Parrots	1	7	10
	Strigiformes—Owls	2	3	4
	Piciformes—Toucans	1	1	1
	Passeriformes—Perching birds	2	2	3
Totals		**11**	**18**	**25**
Mammalia	Insectivora—Hedgehogs	1	1	1
	Edentata—Armadillos	1	1	1
	Lagomorpha—Rabbits	1	1	4
	Rodentia—Mice, etc.	2	2	4
	Carnivora—Foxes, ferrets	2	2	4
	Perissodactyla—Horses	1	2	7
	Artiodactyla—Goats, sheep, camels, etc.	2	4	16
Totals		**10**	**13**	**37**
Amphibia	Caudata—Salamanders	1	1	2
	Salientia—Frogs, toads	2	2	3
Totals		**3**	**3**	**5**
Reptilia	Testudinata—Turtles	2	4	6
	Squamata			
	Sauria—Lizards	1	1	1
	Serpentes—Snakes	2	4	5
Totals		**5**	**9**	**12**

N.B. Totals include four specimens on loan to the NYZS from other collections.

Functioning in four related areas—exhibition and structural design and production, graphics design and production—the department has been involved during the past eighteen months in an enormous range of projects that are reflected in the physical transformation of the Bronx Zoo itself. In addition to designing and producing major exhibitions, interpretive signs and labels, promotional banners, posters, course catalogues, educational brochures, and tour maps, the staff replaced or repaired many of the more than 7,000 signs and labels in the Zoo. Less visible but equally important is the department's long-range planning effort, initiated as part of Zoo Renaissance, to provide guidelines and design "vocabularies" for future development.

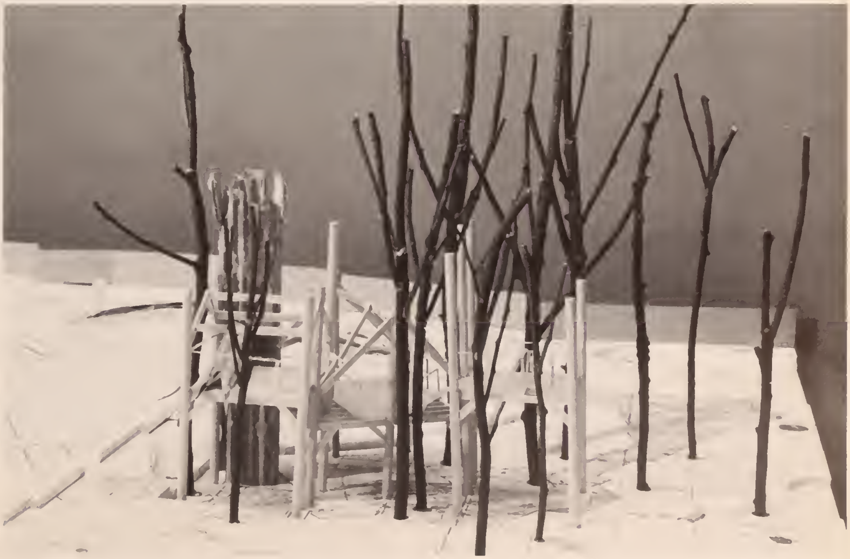
Major exhibitions

The new Children's Zoo represents a fresh approach to educational exhibition. This innovative concept, worked out in collaboration with the Zoo Education Department, was realized in several stages, from site planning to final detailing and site adjustments. The design team, headed by Dorothy Schuster and Gary Jacquemin, was responsible for detailing and coordinating the construction of all landscape elements, participatory exhibits, habitat exhibits, and educational graphics. Many of the naturalistic features, including the raccoon logs, the frog and turtle aquarium, the rock caves, and the giant sliding tree, were fabricated over a long, hard winter by the exhibition production staff.

The new Sea Lion Pool on Baird Court, opened in June 1981, provided another kind of challenge. Based on several sea lion rookeries at Point Lobos, California, the project entailed extensive on-site studies of landscape contours and geological formations, with special attention to the colors, textures, and scale of cliffs and boulders. Photographs taken at various sites were valuable aids in the imaginative fabrication of the sea lions' natural habitat, which was accomplished by Mervin Larson, under the curator's supervision.

Work in progress

Final designs have been completed for three other large projects. The 1899 Flying Cage, due to open in spring 1982 as the De Jur Aviary for colonizing sea birds, is now being constructed with nesting cliffs for Inca terns, a rocky island with sandy beaches for gulls and penguins, and guano covered outcrops for cormorants. The visitor will be able to take a "discovery walk" and share the habitat with the birds.



A comparison between the model for the Forest treetop platform in the Children's Zoo and the final structure (next page) indicates the importance of using the natural environment, and graphically illustrates the subtle site adjustments that were made during construction.

Landscaping, both real and illusionary, has been a major concern in plans for the Rare Large Mammal Building. Murals depicting African landscapes, studied at first-hand, adorn the already completed interior exhibition space. They were executed by artist Christian White. Outside, the site has been designed to recreate a rolling savannah setting for zebras and giraffes, and a more jungle-like environment for okapis or bongo antelope. The scheme includes visitor pathways with carefully conceived sight-lines. Environmental features such as fencing, paths, and seating will be "Africanized" in order to intensify the sense of place.

Now in model form are the complex rain forest habitats designed for the interior of Jungle World in Wild Asia. An impressive array of live and artificial trees, streams, riverbanks, waterfalls, and rock-work will provide a realistic setting for gibbons, tapirs, gharials, langurs, leopards, and free-flying birds. Here, too, the visitor will be able to walk through the landscape and to view the entire exhibition from several vantage points.

Zoo Renaissance planning

The "Zoo Renaissance" program has already produced a number of major achievements, including all the projects described above. In order to give direction to this program of renewal and to establish a structure for improving the Park aesthetically and functionally, the Exhibition and Graphic Arts Department is developing a long-range plan encompassing every aspect of the Zoo's physical plant.

This effort, partially supported by grants from the New York Community Trust, and the National Endowment for the Arts, and the Tortuga Foundation, has already produced an intensive survey of existing operations and facilities—from traffic flow to the placement of garbage cans—that will help to suggest a physical reorganization of the Zoo by providing the background information necessary for making intelligent decisions. Continuation of the planning process will bring the Bronx Zoo into the twenty-first century and help maintain its reputation as the greatest urban zoological park in the world.

In addition to its primary role as an exhibitor and conservator of animal species, the Bronx Zoo is a park, a physical plant composed of buildings, generators, electrical and plumbing systems, paths, and roadways—252 landscaped acres for which the Operations Department is responsible. While much of the large construction work and some specialized jobs are contracted out, the department, which operates electrical, plumbing, paint, machine, and carpentry shops, supervises every project, working closely with curators to meet the distinctive needs of various animals and the practical needs of visitors and staff. The maintenance division repairs and operates the machinery, supervises landscaping, and is generally responsible for keeping the park clean.

Exhibition construction

Fourteen construction projects completed or begun in 1980–81 were part of the extensive program of Zoo Renaissance. These include the innovative new Children's Zoo, designed by the Zoo Education and the Exhibition and Graphic Arts departments, and the new Sea Lion Pool. On the former project the Operations Department acted as the general contractor, supervising construction from ground-breaking to opening. The landscaping and rockwork for the Sea Lion Pool were constructed by the Society's contractor after the renovation of the pool, moats, and railing had been completed by the City of New York.

Work continues on three major projects that will open in the near future. The 1899 Flying Cage, renamed the De Jur Aviary, is being remodeled as a sea bird colony. Rehabilitation of the great cage itself, funded by the City of New York, has been completed, and the Society's exhibits contractor will finish fabricating the landscape of artificial rock during the summer of 1981. Final touches are also being put on the interior of the new Rare Large Mammal Building. Exterior work includes demolition of the old Antelope House, a total transformation of the landscaping around the new building, and the creation of a moat to replace the old iron fences. Both the Aviary and the Mammal Building will open to the public in spring 1982.

Construction on the vast, federally funded Jungle World is ninety-five percent complete. Very extensive exhibition work, including artificial pools, streams, and landscaping, remains to be done.

Smaller exhibits constructed under Zoo Renaissance are the goliath frog display in the Aquatic Bird House and the amphibian and aquatic reptile displays in the Reptile House. Restorations of the Carnivore House, Elephant House, and Hay Barn exteriors are other City-sponsored projects. The brick and decorative stonework of these buildings have been cleaned and pointed to make them completely watertight.

Improvements and renovations

Four improvements in the Zoo's overall plant came under City capital funding. Two diesel-powered emergency generators, for which the preliminary work has been done, will make the Park electrically self-sufficient in the event of a blackout. Several of the six handicapped access ramps added to older exhibition buildings are now in use. The northwest corner sewer line project is awaiting the shipment of a prefabricated pump station, which will bring the entire Zoo into compliance with water pollution regulations. Finally, the original French tile roof of the hay and grain storage facility is being replaced with a new tile roof.

Other improvements completed in the past eighteen months include remedial work on the Rare Animal Range, the Wild Asia corrals, and the bear dens; the addition of gasoline and diesel fuel storage tanks; and an upgrading of the heating and ventilating system at the African Plains Lion House. Projects underway are the installation of dual firing for boilers in the exhibit and service buildings; alterations to the Heads and Horns office building to provide much needed additional space; and the conversion of the old Zebra House into a new education facility.

New York Aquarium and Osborn Laboratories of Marine Sciences

The Aquarium

The President of the United States designated it, and the New York Aquarium celebrated and rejoiced in it: 1980 was the "Year of the Coast." Aquarium exhibitions and educational programs highlighted the essential role played by coastal areas in the total economy of the sea. Coastal waters harbor the majority of the oceans' inhabitants, and it is this land/water interface that gives birth to and nurtures the diverse forms that abound in the sea. The Our Native Sea Life exhibition features fishes from local waters such as large striped bass, porgies, sea robins, flounders, eel pouts, conger eels, sturgeon, black sea basses, tautogs, cunners, and skates. Other exhibitions show off the many invertebrates that reside along our coast, such as sea stars, sea urchins, mussels, clams, horseshoe crabs; blue claw, fiddler, and spider crabs; lobsters, snails, and various sea anemones.

Several exciting new exhibitions were opened in 1980–81, including the new shark exhibition (described in the 1979 Annual Report), the Bermuda Triangle, and the African Rift Lake. The Bermuda Triangle, an area notorious for the mysterious disappearance of planes and ships, is famous for its fascinatingly beautiful sea life. Parrotfish ("cattle of the sea") scrape algae with their sharp fused, beaklike teeth. Butterflyfish and angelfish cavort and pick their food from tiny crevices in the coral. Groupers quietly laze on the bottom and "inhale" their food. Squirrel fish, sergeant majors, blue heads, moray eels; and green, loggerhead, and ridley turtles bring a bit of Bermuda to New Yorkers. Trustee Dr. Henry Clay Frick II collected many of the beautiful specimens. A special exhibition of crayfish collected from Floridian ponds by Trustee Nixon Griffis delighted visitors. Decapod crayfish are related to shrimps, lobsters and crabs. One species, a blind crayfish, is adapted to life in darkness and has an unpigmented body.

Some unusual animals also made their appearance at the Aquarium. Paddlefish are exactly as their name signifies. They are residents of the Mississippi drainage, and their paddles are used to nudge loose bottom-living organisms upon which they feed. And the wolf eel is as ferocious, not to say as ugly, as it looks. It feeds upon crabs with its strong jaw and sharp teeth. The wolf eel normally resides in the North Pacific. Both the wolf eel and paddlefish reach lengths of more than six feet when fully mature.

Lake Malawi has come to Coney Island (that is, a miniature representative of it)! About 2,000,000 years ago a rift cut into East Africa and produced a series of lakes, some of which are among the largest in the world. A spacious new exhibition was designed featuring the cichlids of Lake Malawi. Two hundred and fifty species of cichlids, all from one family, reside in this lake. And these lake cichlids are different from those found in the other lakes. Evolution literally exploded in producing so many species of a single family in a single lake.

The Mayor of New York also came to Coney Island. Mayor Edward I. Koch; Brooklyn Borough President Howard Golden; Henry Geldzahler, Commissioner of Cultural Affairs; and other notables took part in ground-breaking ceremonies at the New York Aquarium. A marine mammal holding and quarantine facility will be built to house whales, dolphins, sea lions and seals. This facility is being built for the Aquarium by the City of New York at a cost of $2,000,000.

Aquarium Education

The "Year of the Coast" provided a pervasive theme for many of the Aquarium's educational programs. Existing lectures were supplemented by discussions of coastal zone management issues. Beach walks and a variety of coastal site visits in the New York area were available to family, community, and organized school groups, as well as summer campers. Special in-depth programs on coastal ecology were created for teachers and school groups, and all Aquarium visitors became aware of the subject in the regular gallery tours and lectures conducted by our high school docents. There were also selected hands-on exhibits and a special display table in the Children's Cove with Year of the Coast activities and artifacts.

The aim of this thematic programming was to make clear the essential role played by coastal areas in the total economy of the sea—and therefore of all life—with the hope that this knowledge might enable people to be more aware of pressing public issues concerning beach accessibility, offshore oil drilling, national and international fisheries management, and the effects of oil spills and toxic wastes on aquatic life.

The three- and four-day summer camp curriculum for six- to eighteen-year-olds was significantly expanded in 1980 as a result of support from the Foundation for the Needs of Others. Here again the focus was on the Year of the Coast, with detailed investigations of coastal plants, animals, and geology.

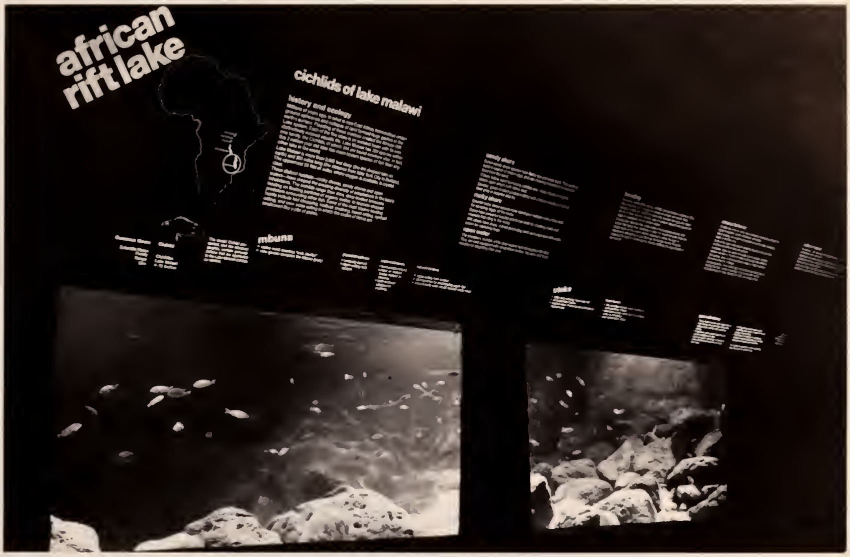
A new wet laboratory exercise involved campers first-hand in dissecting a four-foot dusky shark. Study of the shark's internal and external anatomy was directed to the concept of how adaptations evolve and function, knowledge that was then for-

The loggerhead turtle is the largest species presented in the spectacular new Bermuda Triangle exhibition.

New York Aquarium Census (as of Dec. 31, 1980)

Phylum	Class	Order	Species	Specimens
Chordata	Chondrichthyes—Sharks, rays, chimeras	Heterodontiformes—Horn sharks	1	5
		Galeomorpha—Typical sharks	8	30
		Rajiformes—Rays	2	9
	Osteichthyes—Bony fishes	Holostei—Gars, bowfin	3	12
		Elopiformes—Tarpon, bonefish	1	2
		Anguilliformes—Eels, morays	3	4
		Salmoniformes—Trout	2	50
		Cypriniformes—Minnows, carp, cavefishes	11	500
		Siluriformes—Freshwater catfishes	2	14
		Cyprinodontiformes—Platy, swordtails, killifish	7	90
		Batrachoidiformes—Toadfishes	1	16
		Beryciformes—Squirrelfishes	2	35
		Gasterosteiformes—Seahorses, pipefish	2	14
		Perciformes—Perches, sea basses	135	550
		Pleuronectiformes—Flatfishes	2	20
		Tetraodontiformes—Puffers, boxfish, triggerfish	2	9
		Superorder:		
		Ceratodimorpha—Lungfishes		
		Family:		
		Ceratodidae—Australian lungfish	1	1
		Protopteridae—African lungfish	1	1
	Reptilia	Chelonia—Turtles	6	19
	Aves	Sphenisciformes—Penguins	2	30
		Anseriformes—Ducks	1	7
	Mammalia	Pinnipedia—Seals, sea lions	4	12
		Cetacea—Whales, dolphins	2	6
Coelenterata	Anthozoa—Corals, anemones		28	16,500 +
Arthropoda	Crustacea—Lobsters, shrimps, crabs, etc.		12	111
	Arichnida—Horseshoe crabs		1	2
Mollusca	Gastropoda—Snails		5	25
	Pelecypoda—Bi-valves		2	27
	Cephalopoda—Octopus		3	8
Echinodermata	Asteroidea—Starfish		10	120
	Holothuroidea—Sea cucumbers		3	11
	Echinoidea—Sea urchins		7	60
Totals			**272**	**18,300 +**

The African Rift Lake, opened in April 1981, is one of the most ambitious of the Aquarium's habitat exhibitions. Many of the fish for the new display were donated by the Brooklyn Aquarium Society.



tified with visits to observe the live animals in the shark tank.

An animal training apprenticeship was preceded by a discussion of animal behavior, psychology, and conditioning. While working directly with the animals—giving behavioral cues and rewards—the campers were under the guidance of Aquarium trainers.

Special features of the 1980 Summer Teen Camp included crewing on and collecting specimens from an oceanographic research vessel. A series of salt-marsh field trips, laboratory studies, and lectures concentrated on the natural and derived products of the marine realm, particularly marine drugs as they apply to current biomedical research.

Program evaluations

Several evaluations of existing and newly developed programs were conducted with the assistance of professors from Columbia Teachers College. An ethnographic videotape analysis of our innovative family workshops, which apply family role-playing and games to teaching biological concepts of adaptation and environment, resulted in certain modifications in response to the special learning needs of family units—the Aquarium's principal audience.

Another test involved locating appropriate places to hold classes in a non-traditional teaching facility such as the Aquarium. An important discovery about the importance of territoriality in the learning process was made in this experimental program. Further investigations, involving the use of various settings at the Aquarium for teaching and learning, will proceed in conjunction with Teachers College staff.

Exhibition graphics

In 1980, the Education Department assumed responsibility for writing, designing, executing, and installing all interpretive and identification graphics at the Aquarium. This entailed developing new graphics for the complex African Rift Lake and Bermuda Triangle exhibits, which opened in April 1981, and the Special Exhibit of the Month, as well as monitoring all additions to the collection for identification labels. Special projects connected with the Year of the Coast included promotional graphics, audio-visual shows for the Sea Dome, slide shows for educational groups, families, and special interest groups, and education publications.

Osborn Laboratories of Marine Sciences
Heredity determines exactly when a fish becomes sexually mature and by so doing the gene also determines exactly how large the fish will become. Dr. Klaus D. Kallman has been successful in producing small fish that become sexually mature at an early age and larger ones that mature later in life. He has even effected certain matings in which the fish never becomes sexually mature. Such a fish will be twice as big and weigh three times as much as its sexually mature siblings. These basic studies are important in developing new and efficent ways of increasing animal protein as a food source.

Several of our characteristically top-swimming lemon sharks were uncharacteristically diving to the bottom of the tank and rubbing their bodies against the sand. They had an itch and it was caused by worms. Dr. Paul J. Cheung found that the cause was a new species of worm, and he also devised a treatment that is highly effective. The lemon sharks are once more swimming at the top.

We were surprised to find that some of our young puffer fish developed goiters. Even though these fish live in a saltwater environment and are fed food from the sea, they were not receiving sufficient iodine to prevent goiter. When their environment was enriched with potassium iodide, the goiters disappeared.

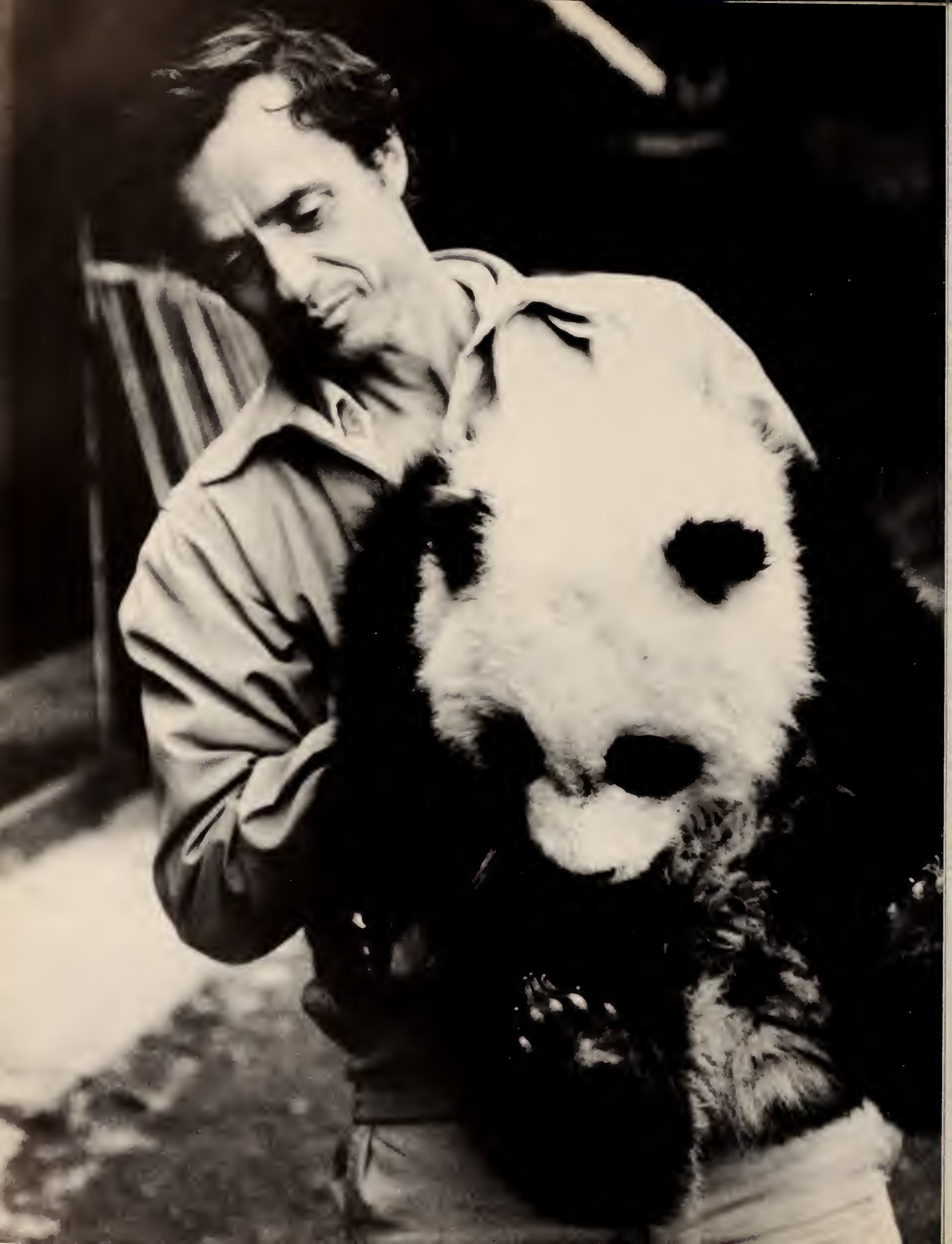
Whatever one discards on land, if it can persist for any period of time, will make its way eventually into the sea. This is especially true of heavy metals such as mercury, nickel, cadmium, and copper. These metals are picked up and accumulated in organisms that are part of the food chain. Dr. Dov Kanner has isolated an offshore bacterium which actually accumulates large amounts of copper. And since bacteria are at the base of the food chain, he wants to define the role played by these copper-laden bacteria in heavy metal poisoning in the flesh of fishes. This study may also presage the development of a bio-technology that will enable the stripping of industrial effluents of their valuable metal content, thereby reclaiming the metal while at the same time cleansing the water of a harmful pollutant.

The crab-crushing wolf eel, native to the northern Pacific, is one of the most unusual Aquarium acquisitions of 1980–81.

The three Jessie Smith Noyes post-doctoral fellows have been conducting basic studies in aquaculture. Dr. Robert Swanson is attempting to grow cells from the striped bass in test tubes as a prelude to developing techniques for the detection of viral infections in fish. Dr. Janice Swenson has been investigating the role of certain protozoa in the food chain. She has found that these protozoa are most abundant at the air/water interface and in the sandy bottom. Attempts are being made to grow these one-celled organisms in pure culture to evaluate their place in the food chain and their value as a food source for potential aquaculture species. Dr. Edmund Zimmerer has been conducting genetic studies to evaluate the breeding success of small, early maturing males in competition with large, later maturing males.

Fourteen undergraduate students representing six universities in the New York area assisted in research projects under the direction of staff. The students received credit from their schools and were also recompensed by a grant from the Alfred P. Sloan Foundation.

The beach adjacent to the Aquarium is an important resource not only for the summer campers shown here, but also for many of the Education Department's programs for school and family groups and other visitors to the Aquarium.



Animal Research and Conservation Center

The conservation mandate

In recent years, man has created a design for coexistence with the natural world; he needs now only to apply his knowledge and live up to his moral imperatives. However, the 1980s finds the environmental movement only in its adolescence, with development proposals that weaken the environment but provide a short-term gain being weighed against proposals that suggest economic stability and ecological harmony.

Wildlife conservation is a mandate that was written into the original charter of the New York Zoological Society in 1895 and has been vigorously pursued by staff members since. Founding Director William Hornaday (1896–1926) helped forge fundamental wildlife laws in the early 1900s; William Beebe set standards for conservation and international field research for over half a century; Society President Fairfield Osborn (1945–68) anticipated the American environmental movement by twenty years with his book *The Plundered Planet* (1948). Osborn wrote that the knowledge needed to save wild places, creatures, and mankind is the same; survival means conforming to the realities of ecology. This is the philosophy and mandate inherited by the Animal Research and Conservation Center.

Through its permanent staff of five field zoologists, ARC conducts long-term ecological studies and educational programs in various parts of the globe. In addition, it provides numerous grants to support special studies and projects, especially those concerned with endangered species. In 1980–81, ARC funded sixty-one such projects in twenty-eight countries. The role of ARC in world conservation is measurable; grants, scientific articles, and proclamations concerning new laws and reserves can be enumerated. What is incalculable is the influence ARC-sponsored scientists have, through their own advocacy, writing, and teaching, on indigenous conservation development in many countries.

Southern Sudan project

Because ecological problems are often more social than scientific, ARC establishes, whenever possible, an integrated program involving both research and education. The southern Sudan, which harbors one of the last great wildlife populations, offers an ideal opportunity for such a program. Initiated by the Frankfurt Zoological Society in West Germany, which helped the Sudan government to find and survey areas suitable for national parks, the project is now a joint effort, with ARC Resource Ecologist, David Western, who has worked in Kenya for many years, and Assistant Director, Archie F. Carr, III directing the research and education program.

There are three principal aims in the project, which began with research biologists Chris Hillman and John Fryxell studying the numbers and movements of several herbivore species in order to provide the Sudan government with information that can be used to establish reserves with realistic boundaries. The first concerns research on the white-eared kob, 600,000 to 800,000 of which roam the Boma National Park of southeastern Sudan. The second involves research on the forest-dwelling bongo antelope and the giant eland in the Bangangai Reserve of southwestern Sudan. Third, and perhaps most important, is the educational program for secondary school children now being planned in conjunction with the African Wildlife Leadership Foundation. The entire undertaking presents a rare opportunity for preserving an ecosystem and species that are now abundant in nature while educating the local population about the issue of conservation.

Other staff projects

Much of the groundwork for the type of program being developed for the Sudan has been laid by ARC field researchers in other areas. David Western has studied the Amboseli ecosystem in Kenya since 1967, not only providing basic data on the functioning of a savannah, but also showing how the conflicting needs of pastoral herders and wild animals can be reconciled. At present he is documenting the ecological basis for migration among the large herbivores, including livestock. Based on broad knowledge gained in his Amboseli studies, he has created a five-year wildlife development plan for the Kenya government, and recently completed a survey of critically depleted wood resources throughout the country as a guide to reforestation.

Other projects in Amboseli include those of Cynthia Moss and Joyce Poole on elephant social behavior, and Michael Milgroom on the effect of elephant and giraffe browsing on the growth of fever trees, which are essential to the ecology of the area.

Thomas Struhsaker is the only foreign wildlife biologist who remained in Uganda throughout the political upheavals of the past decade. The new government has begun to restore its national parks

ARC Director George Schaller holds a young giant panda, one of an elusive and diminishing species in Central China. Schaller's fieldwork plays a crucial role in the joint efforts of the Society, the World Wildlife Fund, and Chinese scientists to save the panda, which may now number only 1,000 in the wild, from extinction.

after a period of wildlife slaughter, and Struhsaker is lending his guidance to the recovery effort. His studies of primates in the Kibale Forest, and in Tanzania and Surinam, have greatly enhanced our comprehension of how closely related species partition their resources and how primate societies maintain themselves from year to year. The rain forest is the most complex and also one of the most rapidly disappearing of the world's great ecosystems. By instituting an educational program for elementary and secondary school children at the local level, Struhsaker hopes at least to save the Kibale Forest for the benefit of future generations.

The work of Roger Payne, and his wife Katharine, has been central to the mission of saving the great whales. Through his research on the migratory routes and calf-rearing requirements of whales, and his precise recommendations for conservation measures, Payne has had an immense influence on both public opinion and government policy. It is an issue that has captivated the public, with the result that the future of whales now looks somewhat brighter.

During the past eighteen months, Payne has supervised other studies on humpback whales, learning that the changes in their songs over the years are shared by all members of a group, which indicates that the details of vocalization are learned. He has also continued to monitor the right whale breeding colony off the coast of Argentina, and has persuaded the Argentine government to declare the species a living national monument.

ARC Director George Schaller has over the years studied a variety of species and habitats. At present he is supervising a project on wildlife in the Pantanal, a vast swampy region in southeastern Brazil. With the collaboration of ARC research fellow Howard Quigley and Brazilian co-workers, research is being conducted on jaguar and marsh deer, both threatened species, as well as on caiman and capybara, animals which could be harvested commercially for meat and hides, thereby contributing to the economy of the area.

Schaller took temporary leave of this project during the first half of 1981 to head the field work for a collaborative study being conducted by the Chinese government and the World Wildlife Fund on the giant panda, a rare animal of which only about 1,000 are extant in the wild. In the central highlands of China—the Wolong Natural Reserve of Sichuan Province—he has to date been able to radio-collar three pandas and to collect data on food habits, movements, and other aspects of panda

Thomas Struhsaker has spent ten years studying the primates as well as the entire ecosystem of Kibale Forest, Uganda, including this tiny hyrax. His work has been instrumental in reserving a portion of the area and in initiating a program of conservation education for young Ugandans.

behavior. NYZS General Director, William Conway, and Veterinarian, Dr. Emil Dolensek, also participated in the project, the former by helping to design a breeding station for pandas and the latter by assisting in the artificial insemination of captive females and preparing a management plan for the captives and their offspring. An integrated study program of both captive and wild animals is designed to help ensure the survival of the panda, a symbol of world conservation.

ARC's expanding role

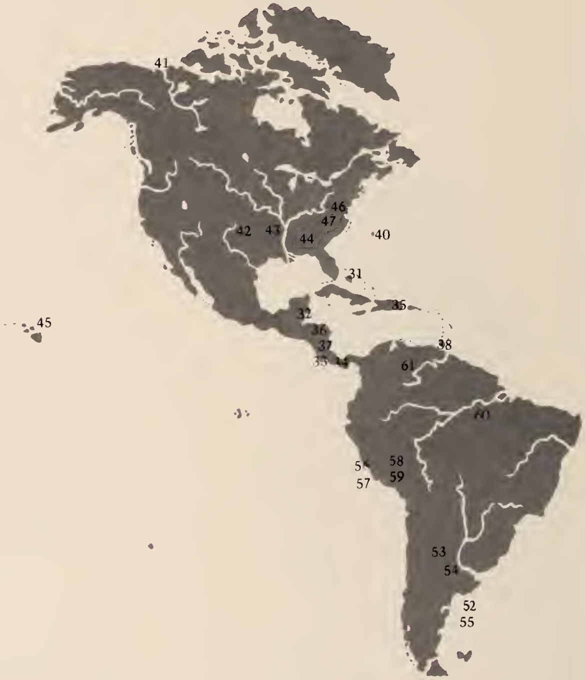
In March 1980, Archie F. Carr, III was made Assistant Director of ARC to help operate the Center's research grant program and lay the foundation for a major expansion of its financial base. His appointment also adds greater depth to the staff's expertise concerning tropical conservation in the western hemisphere. In this area there have already been several new projects planned, including a survey of the conservation needs of Mona Island, Puerto Rico, and of the barrier coral reef of Belize (British Honduras), to be carried out by an intern assigned to ARC from the Yale School of Forestry and sponsored by the Richard King Mellon Foundation. Associations have also been developed with wildlife authorities in Honduras and Nicaragua with a view toward improving conservation in those countries.

Over the past eighteen months, Carr has represented the Center's views in meetings of the Species Survival Commission, in Federal government hearings, and at international treaty conventions pertaining to endangered species. The most recent of these functions was the third conference of the parties to the Convention on International Trade in Endangered Species (CITES), held in New Delhi, India, in March 1981.

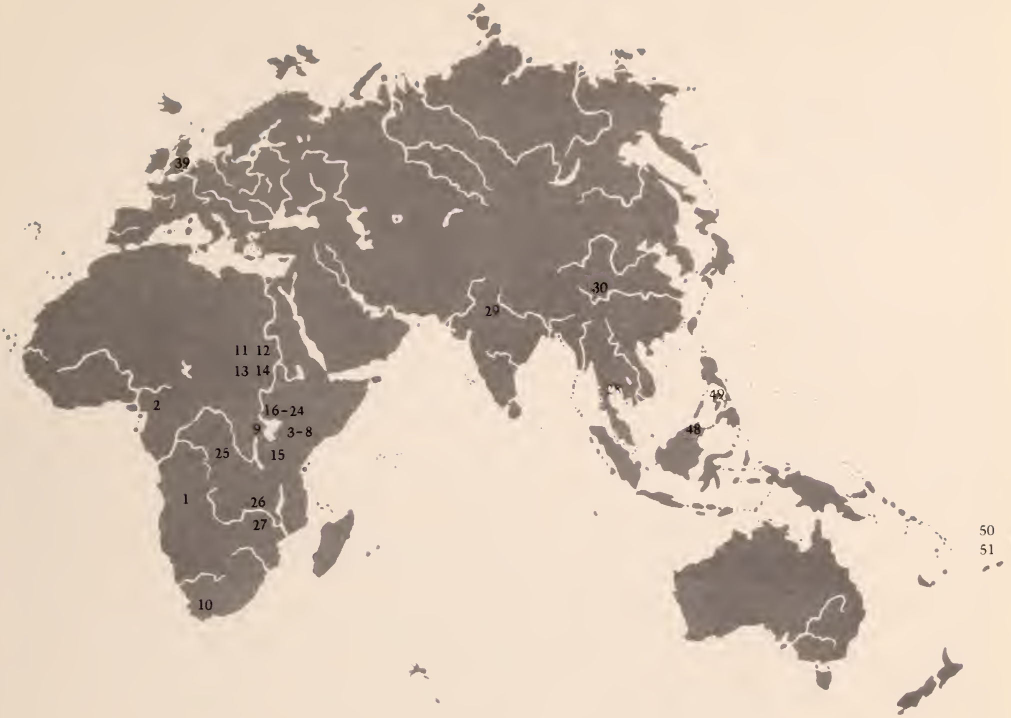
Both the Director and Assistant Director are working with the staff on program development for ARC, seeking to achieve greater regional impact from field projects and the kind of integration of research and education that has distinguished the Amboseli, Kibale Forest, and whale projects, and that is now planned for the program in the southern Sudan.

Amboseli National Park in Kenya has been the center of ARC Resource Ecologist David Western's activities since 1967. As part of the overall scientific and educational program, Cynthia Moss (below) has been studying the behavior of the African elephant since 1972.

ARC International Field Projects



	Project	Researcher & Location
	Africa	
1	Giant sable antelope study	Richard Estes *Angola*
2	Cameroon gorilla emergency investigation	J. Stephen Gartlan *Cameroon*
3	Ecology of Amboseli National Park and purchase of a computer	David Western *Kenya*
4	Interpretive exhibit for Amboseli National Park	D M Mbuvi *Kenya*
5	Behavior of elephants in Amboseli National Park	Cynthia Moss *Kenya*
6	U.S. National Park Seminar	Robert Oguyo *Kenya*
7	Behavioral ecology of the male African elephant in Amboseli National Park	Joyce Poole *Kenya*
8	Crop-raiding in a population of olive baboons	Shirley Strum *Kenya*
9	Analysis of the feeding ecology of mountain gorillas in Parc National des Volcans	Amy Vedder *Rwanda*
10	Cape vulture study	Joan Clare Dobbs *South Africa*
11	Tuition for two Sudanese students at the College of African Wildlife Management in Mweka, Tanzania	James Peter Dulling & Landi Amis *Sudan*
12	Ecological studies of the white-eared kob in Boma National Park	John Fryxell & A.R E. Sinclair *Sudan*
13	Studies of the bongo and giant eland	Chris Hillman *Sudan*
14	Survey of research sites for wildlife conservation	Archie Carr III, George Schaller, & David Western *Sudan*
15	Survey of forest distribution, Uzungwa Mountains	W A. Rogers and K.M. Homewood *Tanzania*
16	Rehabilitation of the Uganda Institute of Ecology's library	Edward Edroma *Uganda*
17	Effects of seed dispersal by primates on tree regeneration	JoAnne Kalina *Uganda*
18	Scholarship at Michigan State University	J. Kasenene *Uganda*
19	Vegetarian responses to reduced herbivory in African (Uganda) savannahs	Robert Malpas *Uganda*
20	Status survey of wildlife in Uganda's parks	Robert Malpas *Uganda*
21	Study of the ecology of the Kibale Forest and six of its primate species	Thomas Struhsaker *Uganda*
22	Rain Forest Research Center, Kibale	Thomas Struhsaker *Uganda*
23	Conservation Education: A Pilot Project in the Kibale Forest	Thomas Struhsaker *Uganda*
24	Study of human encroachment and habitat disturbance in forest and game reserves and national parks	Karl Van Orsdol *Uganda*
25	Census of the Virunga Volcanoes mountain gorilla population	A.H Harcourt *Zaire*
26	Habitat elephant management and communal species research in Luanga Valley	Dale Lewis *Zambia*
27	Ecology of the Nile crocodile	David Cummings *Zimbabwe*
	Asia	
28	Behavior and conservation of the pileated gibbon	Warren Brockelman *Thailand*
29	Representative at the Convention on International Trade in Endangered Species, New Delhi	Archie Carr III *India*
30	Conservation of the giant panda	George Schaller *People's Republic of China*
	Central America and the Caribbean	
31	Conservation and biology of the Bahamian hutia	Garrett Clough *Bahamas*
32	Operational expenses for Yale-Mellon field project	Judy Perkins *Belize*
33	Foraging patterns and dispersal of lauraceous seeds by quetzal	Nathaniel Wheelwright *Costa Rica*
34	Ecology of the tapir in Central America	Keith Williams *Costa Rica*



35	Investigation of the non-reproductive biology of the *Crocodylus acutus* in Lago Enriquillo	John Thorbjarnarson *Dominican Republic*
36	Ecological survey and management of a rain forest park	Jeffrey Froelich *Honduras*
37	Transportation and maintenance of Nicaraguan biologists in Costa Rica	Reynaldo Arostegui *Nicaragua*
38	Assistance to the Pointe-a-Pierre Wildfowl Trust	Molly Gaskin *Trinidad*

Europe

39	Book on international treaties concerning wild-life conservation	Simon Lyster *England*

North America

40	Conservation study	David Wingate *Bermuda*
41	Behavioral study of bowhead whales in the eastern Beaufort Sea	Roger Payne *Canada*
42	Social behavior and genetic variability in the Wichita Mountains bison herd	Tracy Carter and James H. Shaw *USA*
43	Preparation of report on game ranching for CITES meeting	Alexandra Dixon *USA*
44	Propagation and further distributional analysis of the endangered red-bellied turtle	Terry Graham *USA*
45	Study of humpback whale vocalizations off the coast of Maui, Hawaii	Roger Payne *USA*
46	Publication of colorplates of the crested iguana	Society for the Study of Amphibians and Reptiles *USA*
47	Environmental planning	Global Tomorrow Coalition *USA*

Oceania

48	Nature center in Sepilok, Sabah	Arthur Mitchell *Borneo*
49	Gray's monitor lizard study	Walter Auffenberg *Philippines*
50	Conservation of newly discovered crested iguana	John Gibbons *South Pacific*
51	Purchase of crested iguana film	John Gibbons *South Pacific*

South America

52	Seasonal changes in the acoustic behavior and population of the southern right whale in the Golfo San Jose	Jane Moon Clark *Argentina*
53	Hooded grebe study	Fundacion Vida Silvestre *Argentina*
54	U.S. National Park Seminar (tuition and airfare)	Guillermo Anival Giroli *Argentina*
55	Monitoring of right whale breeding colony	Roger Payne *Argentina*
56	Humboldt penguin survey	Donald Bruning *Peru*
57	Humboldt penguin survey	Coppelia Hays *Peru*
58	Field study of the moustached tamarin	Marleni Ramirez *Peru*
59	Survey of the immune system of carrion-eating birds	Stanley Temple *Peru*
60	Conservation studies of jaguar, marsh deer, capybara, and caiman	George Schaller *Brazil*
61	Ecological correlates of the social system and foraging behavior of the hoatzin	Stuart Strahl *Venezuela*

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Publications Department

Animal Kingdom expansion plans

At the close of the fiscal year 1981, *Animal Kingdom* had achieved its largest circulation in history: 126,000. The number of American zoological societies providing the magazine to their members increased to twenty-six.

Despite such growth the publication continued to be a deficit operation (approximately $125,000 per year). Clearly *Animal Kingdom* needed additional revenue that could be generated only by a great many more subscribers and sales of advertising space. As the first step in determining whether the magazine had the potential to become a mass-market magazine with advertising pages, the Publications Department engaged management consultant James B. Kobak to prepare a business plan, or feasibility study.

Kobak surveyed the probable competition from science, nature, and quality magazines; identified the most likely advertising prospects; reviewed the editorial product being created by the *Animal Kingdom* staff; and developed financial projections on a computer model. These forecasts—using a variety of assumptions about response rate to direct mail marketing, selling price, advertising sales, subscriber renewal rates, bad pay rates, and other factors—indicated that *Animal Kingdom* could break even by 1983 and produce income for the Society by 1985.

During this period in which the business plan was being prepared, the magazine also employed a leading market research firm, Mark Clements & Company, to survey the current *Animal Kingdom* readership. Clements mailed a six-page questionnaire containing more than ninety questions to a sample of one thousand readers. There was only one mailing with no follow-up, yet 58.3 percent returned the survey, an excellent response by market research standards. The demographic profile of readers that emerged revealed them as an "upscale" group: seventy-five percent attended college, fifty percent graduated, and twenty-five percent hold postgraduate degrees; median family income is $30,000; fifty-four percent hold professional or managerial jobs; forty-four percent have valid passports; and fifty-four percent own 35mm cameras. The study also provided considerable data on the readers' editorial preferences, both for the existing magazine and for a possible expanded format.

Revision of the magazine itself—expanding, upgrading, and revamping the editorial format—then became a priority. The staff developed new article and department concepts to broaden coverage and appeal. While the animal theme remains central, editorial content will be expanded into such subject areas as anthropology, cultural history, the performing and fine arts, biography, botany, geography, evolution, mythology, ethnography, psychology, medicine, photography, economics, and politics. The Department also retained graphics consultant John Peter to redesign the magazine in a way that reflects the stature, authority, and tradition of the New York Zoological Society. This new design made its debut in the April/May 1981 issue.

Since all elements of the business plan, readership research, and editorial revision appeared favorable, the Board of Trustees authorized the next phase, a direct mail test of potential markets. Walter Weintz & Company, specialists in direct response promotion, were retained to prepare five different tests for mailing to 175,000 people early in July 1981. As the test was being prepared the *Animal Kingdom* staff was also creating a pilot issue reflecting the new design and expanded editorial format. Copies of the pilot will be used to sell advertising and raise funds to underwrite the launching of *Animal Kingdom* as a mass-market publication. If the complete results and analysis of the mailing, expected by late September, are favorable, the *Animal Kingdom* staff will expand from the present eight people to thirty, and the selling of advertising space will commence. Another much larger mailing will be done in December 1981, and the first issue of the new, enlarged *Animal Kingdom* will appear in February 1982.

Special issues and awards

The magazine has already moved in a new direction over the past eighteen months, publishing investigative reports that explore all sides of controversial issues in the field of wildlife conservation. The first of these—"The Ivory Wars"—occupying the entire February/March 1980 issue, was devoted to the impact of the international ivory trade on the African elephant's survival. It was funded in part by a grant from the Allied Chemical Corporation to the Society's Charles W. Nichols, Jr. Wildlife Conservation Publications Fund. Allied has since provided additional support to underwrite future investigative reports, some of which are now in preparation. Other examinations of important conservation issues included a two-part series on "The Selling of the Rhino" (February/March 1981), a report on the smuggling of parrots (April/May 1981), and an interpretation of the *World Conservation Strategy* (June/July 1981).

In the spring of 1981 the Society of Publications Designers awarded *Animal Kingdom* three Certificates of Merit and the Society of National Associa-

Animal
Kingdom
THE IVORY WARS
An investigation of the controversy over the international
ivory trade and its impact on the survival of the African elephant

Using its entire February/March 1980 issue, *Animal Kingdom* published the conservation story of the year, which later was cited as a finalist in the National Magazine Awards.

tion Publications presented the New York Zoological Society with two certificates of recognition. The magazine was also a finalist (for the aforementioned "The Ivory Wars") in the National Magazine Awards, the most prestigious of all prizes for magazine journalism.

Bronx Zoo guide

The staff also published a new *Official Guide to the Bronx Zoo*, which provides a behind-the-scenes understanding of how the Zoo works, as well as a history and comprehensive description of the Zoo's exhibits and services. The one-hundred-page guidebook is the first such publication since 1969.

Photographic Services

The need for photographs has mushroomed in recent years along with the tremendous growth in publicity efforts, fund-raising projects, educational programs, lectures by staff members, and exhibition construction at the Zoo and Aquarium. Staff photographers Bill Meng and Dennis DeMello document every event and practically every animal to provide a comprehensive visual history of the Society. In 1980–81 this included the construction and opening of the Children's Zoo, the appearance of the newborn gorillas and polar bear, the gaur transfer experiment, the visit of a delegation from China, and many other noteworthy occasions.

One of the highlights of the February 1981 annual meeting was the Zoo and Aquarium film, "Year of the Tiger," which followed the growth of four Siberian tiger cubs and recorded other significant events at both institutions. Footage produced at the Zoo was also used on the popular television show "Wild Kingdom," with Marlin Perkins, in an episode about the successful effort to propagate Andean condors in captivity and release them into the wild.

Public Affairs

The New York Zoological Society's Membership, Development, and Public Relations departments have been consolidated into a new division of Public Affairs. This reorganization will enable staff to create a stronger, more integrated, and more efficient marketing program, with the specific goals of strengthening the Society's ability to generate private funds in support of its various programs, and of developing new audiences for the Bronx Zoo and New York Aquarium. The Animal Kingdom Fund campaign, special events at the Bronx Zoo, trustee liaison, advertising, and group sales are continuing areas of work also conducted within this new division.

Development

In the twelve months ended June 30, 1981, private contributions to the New York Zoological Society totaled $4,632,000. Of this total, $2,987,000 was contributed for current purposes and projects, in both unrestricted and restricted gifts, and gifts to the Animal Kingdom Fund and to endowment amounted to $1,609,000. The latter represents contributions from thirty donors—individuals, foundations, and corporations.

Phase I of the Fund, the first $10,000,000, was completed in fall 1980. At the close of the fiscal year, the Fund stood at $11,165,895, with $1,165,895 having been contributed to Phase II. Established with an overall goal of $20,000,000, the Fund was begun in late 1976, and to date, 107 major contributions have been received. The Animal Kingdom Fund Committee and all donors are listed on pages 70-71 of this Report.

The Fund was created to increase the Society's financial stability by augmenting funds functioning as endowment and by providing capital to underwrite revenue-producing and attendance-increasing (and thereby revenue-producing) ventures and exhibitions at the Zoo and Aquarium. In the period from January 1, 1980 through June 30, 1981, capital from the fund was used to underwrite capital planning for the New York Aquarium, the Central Park Zoo project, and Jungle World; the six new Safari Tour trains; animal collecting expeditions for the Zoo and Aquarium; ramps for the handicapped at the Zoo; and development planning for *Animal Kingdom* magazine.

The major Animal Kingdom Fund project to date is the new Children's Zoo at the Bronx Zoo, built with $1,400,000 in Animal Kingdom Fund contributions. The Children's Zoo provides an excellent example of ways in which Animal Kingdom Fund projects are meant to enhance the Society's public services and financial well-being. The new Children's Zoo has helped to increase Bronx Zoo attendance since its opening on May 21; in the forty-one days prior to June 30, 150,000 visitors paid $.80 each for children and $.70 for adults.

The Development Department operated sixty-nine special events, briefing sessions, parties, and benefits in in this eighteen-month period. The most notable was the Fairfield Osborn Memorial Lecture, delivered by H.R.H., The Prince Philip, Duke of Edinburgh, on October 1, 1980. The lecture, at Avery Fisher Hall, was attended by 2,500 people—the Society's members, friends, and donors, and those of Rockefeller University and the Conservation Foundation. A dinner in honor of the Duke of Edinburgh followed the lecture; proceeds benefited the Society's Animal Research and Conservation Center. It was held at the Waldorf-Astoria Hotel, and was attended by 1,000 ARC contributors. The Chairman of the dinner was Howard Phipps, Jr., who was assisted by Mrs. Vincent Astor and Laurance S. Rockefeller. A reception was held before the dinner for major donors, and Benefactors and Sponsors. Mr. and Mrs. Michel C. Bergerac served as Chairmen of the Benefactors and Sponsors, who were donors of $25,000 and $10,000 respectively. This event generated $738,000 for ARC operations from individual, foundation, and corporate donors.

The Society's development staff worked closely with the Business Committee in fiscal 1981 to increase the receipts of the Committee's annual campaign to $428,000, a ten percent increase over the 1979 results. Under the co-chairmanship of Edgar M. Cullman and John Elliott, Jr., the Committee stood at thirty-three members on June 30. During the year several new members were added—Rand V. Araskog, Mrs. Charles A. Dana, Jr., Mrs. James H. Evans, Peter H.C. Huang, and John Leslie. Since its creation in 1976, the Business Committee has conducted campaigns which have raised an aggregate of $1,600,000 in corporate support for current purposes. In fiscal 1981, the Society's contributions for all purposes from corporate sources were at an annual high of $750,000. This grand total includes corporate gifts to the Business Committee's campaign, to ARC, and for such special purposes as the Osborn Laboratories and the Women's Committee's June benefit.

The Women's Committee is the most active of the Society's several volunteer fund-raising groups. Their dinner at the Zoo on June 10, "A Salute to Noah," the fourth party in a biennial series, brought 1,000 guests to the Zoo for twilight in the Children's Zoo and dinner under a tent adjacent to Wild Asia. Under the co-chairmanship of Mrs.

The Great Egg Event at the Zoo in April was a celebration of eggs and the birds and reptiles that hatch from them. Grandmother Earth led a parade of musicians, live animals, and visitors through the Zoo at the end of each day's festivities.

Driggs Hultkrans and Mrs. Joseph A. Thomas, the party raised $360,000.

Initiatives developed during the year to identify new sources of support included two direct-mail campaigns. For the benefit of the Animal Research and Conservation Center, nationwide mailings were tested in the fall of 1980, and were successful enough that plans were made to solicit up to 1,000,000 households across the country in the calendar year 1981. This campaign is just one element in a new program to gain private support for ARC. Another new direct mail campaign, first conducted with underwriting support by the Vincent Astor and Robert Sterling Clark foundations, is an extension of the annual appeal. This campaign identified 7,062 new contributors to the Society in the eighteen months ended June 30, 1981.

Membership

At June 30, 1981, membership enrollment stood at 19,100 individuals and families. This is an increase of almost fifty percent over the figure on December 31, 1979, the last date on which there was a published report. This growth has been accomplished by direct mail solicitation and by on-site sales to Zoo visitors.

Twenty percent of these members made contributions above and beyond their dues, and in annual dues and contributions, Society members are now responsible for approximately $1,000,000 in unrestricted income annually. Membership is also a way in which the Society provides some of its most intensive public service, and in the past eighteen months, membership events, ranging from the annual clean-up of Wild Asia to the Annual Meeting at Avery Fisher Hall, have entertained and educated approximately 25,000 people, usually at the Zoo or at the Aquarium.

The Society's members are served by a separate travel department, which in 1980 and the first six months of 1981 organized tours involving a total of 450 members. About two-thirds of this number participated in day or weekend trips to Cape Cod, St. Catherine's Island, the Pine Barrens, or other wildlife observation areas, while 159 took two- or three-week tours, including trips to the Galapagos

Egg games were a popular feature of the Great Egg Event.

Islands, China, and the Antarctic, and a tented safari in Kenya.

Public Relations

The Society began to organize a new public relations program in early 1981. When it is permanently staffed, this program will include the management of all media relations and an annual advertising campaign, the creation and execution of a series of major special events, the publication of many institutional brochures and reports, and it will provide Society-wide information to the public in various other ways. The staff's aim is to make the work and programs of the Society and all its principal divisions—the Bronx Zoo, the New York Aquarium, the Osborn Laboratories, and the Animal Research and Conservation Center—better known to the general public and to the philanthropic community, and better understood.

A newly conceived series of large-scale public events at the Zoo was begun in April 1981 with the Great Egg Event, a seven-day festival, the dates of which corresponded with spring vacation in New York City public schools. This kind of programming will always be the subject of carefully prepared media campaigns, as will animal debuts at the Zoo and Aquarium. The debut of the Zoo's new polar bear cub Snowflake in early April, on the day before Palm Sunday, was the subject of a media campaign which resulted in extensive coverage in print, radio, and television.

The new Children's Zoo, which opened on Memorial Day Weekend 1981, provided the best material for the press, however, and received major coverage, including five metropolitan television news programs, two national news programs, international wire services, all greater New York area newspapers and magazines, several national magazines and radio programs, and half-a-dozen major children's and educational publications.

Publicity and advertising have also been used recently to increase public awareness of the annual reopening of Wild Asia, the Aquarium's unusual education program, the Zoo's new gorilla infants, the new Sea Lion Pool, births of endangered species at the Zoo, and many other Zoo and Aquarium events.

Administrative Services

Admissions, Parking, and Transportation

Visitor comfort on the popular guided Safari Tours was considerably increased in 1980–81 with the acquisition of six newly designed bright orange trains, all now in service.

Bronx Zoo attendance totaled 787,530 people in the first six months of 1980 and 1,737,441 in fiscal 1981. Figures in the same periods for the Bengali Express in Wild Asia were 154,234 and 428,825; for the Safari Tours, 53,116 and 155,620; and for the Skyfari, 172,462 and 317,955. Aquarium attendance totaled 180,603 from January 1 through June 30, 1980 and 414,258 from July 1, 1980 through June 30, 1981.

Food and Souvenirs

Services to the public were expanded in various areas during 1980–81. Several facilities were added, others enlarged and renovated. These capital improvements, as well as tighter buying procedures, a larger variety of products, and an increase in prices, resulted in greater sales of food and souvenirs than ever before.

The most distinctive acquisition was a "Gay Nineties" popcorn wagon, which is now stationed near the Elephant House. The interior of the cafeteria was extensively remodeled—with new seating, better acoustics, and colorful banners—to create a bright, airy, quiet, and modern ambiance. Six new mobile Italian ice wagons were added at the Zoo and two at the Aquarium.

Changes in souvenir services included relocation of the Bronxdale stand within the Bronxdale admissions area and expansion by one-third of the African Plains stand. The Sea Lion stand was given a new exterior more in keeping with the new Sea Lion Pool, and the Elephant's Trunk stand was resurfaced to relate it architecturally to the new Children's Zoo. The latter stand featured a new

One of the six Bengali Express monorail trains passes Chitawan Valley, home of the Indian rhinoceroses, during its twenty-five minute ride through the thirty-eight acres of Wild Asia.

line of items, including banners and rings, to celebrate the opening of the Children's Zoo. At the Safari Shop and elsewhere, there was an increased emphasis on animal-related educational items.

Personnel

There were 770 people employed by the New York Zoological Society in 1980–81, 355 of them on the full-time staffs of the Bronx Zoo, New York Aquarium, Osborn Laboratories, and the Animal Research and Conservation Center. Among them were curators, keepers, administrators, writers, fund-raisers, designers, photographers, editors, maintainers, attendants, research scientists, field biologists, and construction personnel. Also employed were 415 seasonal employees—souvenir and refreshment-stand salespersons, tour guides, ticket takers, parking and admission attendants, temporary maintainers—working from April through October. Of these 378 were young New Yorkers, primarily from the Bronx and Brooklyn.

In late 1980, negotiations with Local 1503 of District Council 37 were conducted by the Personnel Department. Agreement was reached with the union on a new three-year contract running from January 1, 1981 through December 31, 1983.

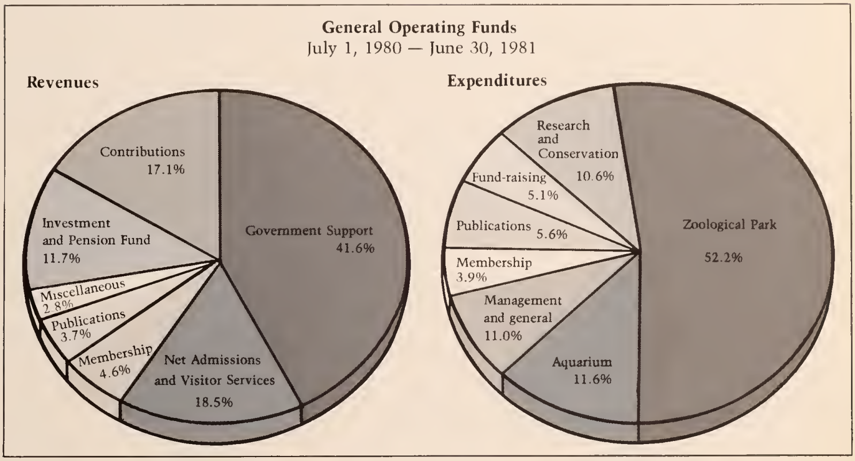
Federally-funded CETA programs came to an end in 1981. The Society was able to move more than twenty of these people to permanent positions over the life of the program. New sources for personnel support are now being sought in the private sector to sustain this program loss.

The Society continued to participate in Urban Corps, the Title X Aging Program, the Youth Employment and Training Program, and Capture, a program for handicapped youth that provides unique opportunities to individuals who might otherwise be unable to obtain meaningful work.

Report of the Treasurer

During the fiscal year from July 1, 1980 through June 30, 1981, expenditures for general purposes were $17,212,970, exceeding revenues by $36,783. Expenditures for capital projects of $2,452,884 were $112,096 greater than available revenues. The combined deficit for operating funds was $148,879.

Of $17,176,187 in general operating revenues, 41.6 percent came from government sources, 29.6 percent from operations, 17.1 percent from contributions, and 11.7 percent from investment and pension fund revenues. The Zoo and Aquarium required 63.8 percent of general operating expenditures. Research, conservation, publications, and membership programs required 20.1 percent and supporting services, 16.1 percent.


General Operating Funds
July 1, 1980 — June 30, 1981

In the current fiscal year, combined admissions and visitor services contributed a net revenue of $2,426,412 toward operations at the Zoo and Aquarium. Despite double-digit inflation and legislation increasing wage rates, cost of goods sold and direct labor increased less than one percent.

Per capita spending by visitors at the Zoo has increased sixty-one percent over the past five years to $2.47, with admissions revenues increasing this figure to $3.26. The Society continued its policy of free admission to the Zoo, three days per week. At the Aquarium, which is lacking the kinds of revenue-producing facilities recently developed at the Zoo, per capita spending only increased twenty-one percent during the same period to $1.16, with admissions revenues raising the figure to $2.49.

Admissions revenues increased $220,489 at the Zoo, and decreased $8,096 at the Aquarium. Attendance at both facilities is reflected in the following chart:

	Zoological Park		Aquarium		Combined	
Fiscal Year	Visitors	Revenues	Visitors	Revenues	Visitors	Revenues
1977	1,756,587	$ 812,982	467,119	$ 627,623	2,223,706	$1,440,605
1978	1,613,617	949,706	399,388	525,466	2,013,005	1,475,172
1979	1,635,543	921,735	433,194	553,653	2,068,737	1,475,388
1980	1,683,249	1,143,710	423,966	559,000	2,107,215	1,702,710
1981	1,737,441	1,364,199	414,258	550,904	2,151,699	1,915,103

Born on November 23, 1980, the polar bear cub Snowflake made her public debut on April 11, 1981, in the very protective custody of her mother Russia.

Membership dues accounted for $468,017 net, with $62,576 allocated to *Animal Kingdom* magazine. The Society sponsored travel program for members added an additional $141,043 in revenues.

Revenues from government agencies increased 12.7 percent over the previous fiscal year. The City of New York contributed $4,131,263; the State of New York, $1,234,700; and Federal sources, $98,903.

City-supported positions numbered 170 at June 30, 1981. In addition, the City contributed $543,411 to utility costs at the Zoo and Aquarium. A substantial increase in support from the State through the Natural Heritage Trust was earmarked for the New York Aquarium.

Education courses and camp programs at the Zoo and Aquarium provided revenues of $105,401. Miscellaneous revenues, including $112,604 from the World Wildlife Fund and the National Geographic Society, totaled $267,991.

Net revenues from events during the year contributed more than $750,000. In addition to the dinner last October following the Fairfield Osborn Lecture, which raised $457,000 for ARC, an Osborn Laboratories' event in Brooklyn netted $71,000. In June, the Women's Committee held "A Salute to Noah," which netted $240,000 toward their goal of raising $300,000 for the new Children's Zoo.

The Animal Kingdom Fund by June 30 had raised $11,165,895 since its inception in the fall of 1976. Since then it has supported projects totaling $2,769,369 while generating nearly $1,500,000 in investment income toward current operations.

The Society raised $4,632,054 through contributions and fund-raising events. The table below details these amounts:

	Balance June 30, 1980	**Amount raised**	**Amount expended**	**Balance June 30, 1981**
Operating funds				
Unrestricted		$1,105,297	$1,105,297	
Restricted	$1,349,140	1,881,736	1,543,535	$1,687,341
Expiration of term endowment	1,455,871		1,455,871	
Subtotal		$2,987,033	$4,104,703	
	Outstanding pledges	**Amount raised**	**Pledge collections**	**Outstanding pledges**
Endowment funds				
Income restricted		$ 100,000	$ 100,000	
Animal Kingdom Income unrestricted	$3,143,437	1,545,021	3,494,180	$1,694,277
Subtotal		$1,645,021	$3,594,180	
Total amount raised		**$4,632,054**		

Especially pleasing was the performance of endowment funds and long-term investments. The combined market value of these funds totaled $20,119,199, up from $14,801,902 the previous year. Total return was 31.2 percent for the last twelve months.

Dividend and interest income earned on the portfolio amounted to $1,231,751. Investing daily balances netted an additional $110,559, while $89,073 was received from the New York Community Trust, representing the current yield on funds being held for the benefit of the Society.

Endowment and funds designated for long-term investment:

	Market value June 30,1980	**Market value June 30,1981**
Long-term investments	$ 5,411,480	$ 6,940,618
Animal Kingdom	5,219,196	8,290,645
Endowment	4,171,226	4,887,936
	$14,801,902	**$20,119,199**

Expenditures
Society expenditures for general operations were $17,212,970. Personnel costs were $9,398,469 (54.6 percent); gas, electric, and fuel oil costs were $913,965 (5.3 percent); food and forage costs for the collections were $531,107 (3.1 percent). Cost of goods sold for visitor service operations were $1,000,467 (5.8 percent); advertising costs were $326,495 (1.9 percent); grants to ARC research associates totaled $328,676 (1.9 percent). Telephone ($164,037), postage ($204,541), and insurance ($201,679), accounted for 3.3 percent, and the remaining 24.1 percent represents expenditures for professional services, repairs and renovation of exhibits, supplies and materials, and replacement of equipment.

Capital outlay
During the fiscal year, the Society opened its new Children's Zoo, expanded its Sea Lion Pool and brought new tour trains into service. At the Aquarium, through the City's capital budget, the shark tank was redesigned as the Bermuda Triangle exhibition.

The table below reflects current capital projects in progress or completed at year end:

Capital projects	Expended through June 30, 1980	Current fiscal year expenditures	Expended through June 30, 1981
Children's Zoo	$ 236,429	$1,398,908	$1,635,337
Rare Large Mammal Building	1,421,726	226,143	1,647,869
Tour trains	345,192	55,222	400,414
Central Park Zoo	77,463	206,343	283,806
De Jur Aviary *	81,130	145,020	226,150
Sea Lion Pool *	39,799	151,473	191,272
Marine Mammal Holding Facility *	77,484	106,953	184,437
Jungle World *	58,708	44,111	102,819
Subtotal	**$2,337,931**	2,334,173	**$4,672,104**
Animal acquisitions		118,711	
Total fiscal year expenditures		**$2,452,884**	

* Capital projects undertaken jointly with the City of New York through its capital budget and Federal public works funds, which account for $6,000,000 in addition to the Society expenditures detailed above.

Outlook
Pursuant to a draft agreement with the City of New York to manage the Central Park Zoo, the Society is continuing to develop an exciting renovation plan. Upon acceptance of the agreement and implementation of the plan, the Society will assume operation of the facility at Central Park.

The Society continues to increase revenue from Zoo and Aquarium operations; fund-raising has helped to close the gap between general revenues and expenditures and to build a term endowment through the Animal Kingdom Fund. Yet, we continue our substantial reliance on the City and State governments for forty percent of our revenues. Public funds remain difficult to predict on a year to year basis.

Monies are not yet in place for necessary capital projects that have already been planned, and much of our physical plant requires renovation. As the 1980s begin, there is a continuing need to balance economic reality with our goal of providing education to the public and support for the survival of wild animals and their natural habitats.

David T. Schiff
Treasurer

Peat, Marwick, Mitchell & Co.

The Board of Trustees
New York Zoological Society:

We have examined the balance sheet of New York Zoological Society as of June 30, 1981 and the related statements of support and revenue, expenditures, capital additions and changes in fund balances and of changes in financial position for the year then ended. Our examination was made in accordance with generally accepted auditing standards and, accordingly, included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

As explained in note 1 to the financial statements, expenditures for land, buildings and equipment are not capitalized, and depreciation of buildings and equipment is, therefore, not recorded. Such practices are not in accordance with generally accepted accounting principles.

In our opinion, except for the effect on the financial statements of the matters discussed in the preceding paragraph, the aforementioned financial statements present fairly the financial position of New York Zoological Society at June 30, 1981 and the results of its operations and the changes in its financial position for the year then ended, in conformity with generally accepted accounting principles applied on a basis consistent with that of the preceding year after giving retroactive effect to the change, with which we concur, in the method of accounting for compensated absences, as described in note 8 to the financial statements.

Peat, Marwick, Mitchell & Co.

August 21, 1981

New York Zoological Society - Balance Sheet
June 30, 1981

Assets	**Operating funds**	**Endowment funds**
Cash (including commercial paper of $500,000)	$ 1,785,041	—
Investments (note 2)	6,735,748	12,119,632
Accounts receivable	749,477	—
Grants receivable (note 3)	670,019	—
Inventories, at lower of cost or market	294,956	—
Prepaid expenses and deferred charges	150,446	—
	$ 10,385,687	**12,119,632**
Liabilities and Fund Balances		
Accounts payable and accrued expenses	1,185,144	—
Accrued employee benefit costs (note 8)	560,854	—
Deferred support and revenue—restricted (note 6)	2,147,627	—
	3,893,625	—
Fund balances:		
Unrestricted:		
Designated for long-term investment	6,128,033	—
Undesignated	364,029	—
Endowment:		
Income—unrestricted	—	2,681,342
Income—restricted	—	1,813,644
Term endowment—income unrestricted	—	7,624,646
	6,492,062	12,119,632
	$ 10,385,687	**12,119,632**

See accompanying notes to financial statements.

Statement of Support and Revenue, Expenditures, Capital Additions, and Changes in Fund Balances
Year ended June 30, 1981

	Operating funds			
	General	Capital outlay	Total	Endowment funds
Operating support and revenue				
Contributions and fund raising events, net (note 4)	$ 2,244,760	1,859,943	4,104,703	—
Fees and grants from governmental agencies	5,464,866	—	5,464,866	—
Admission charges	1,915,103	—	1,915,103	—
Visitor services revenues	4,544,670	235,325	4,779,995	—
Membership dues and travel	609,060	—	609,060	—
Endowment and other investment income	1,342,956	163,678	1,506,634	—
Pension fund revenues (note 5)	200,000	—	200,000	—
Publications and related revenues	481,380	—	481,380	—
Education program revenues	105,401	—	105,401	—
Collection sales	—	72,787	72,787	—
Miscellaneous revenue	267,991	9,055	277,046	—
Total operating support and revenue	**17,176,187**	**2,340,788**	**19,516,975**	**—**
Expenditures:				
Program services.				
Zoological Park	6,883,015	659,497	7,542,512	—
Aquarium	1,524,566	132,914	1,657,480	—
Survival Center	203,486	—	203,486	—
Animal Research and Conservation Center	874,318	—	874,318	—
Marine Sciences	327,704	—	327,704	—
Publications	733,528	—	733,528	—
Visitor services and admissions	4,033,361	1,454,130	5,487,491	—
Membership activities	510,647	—	510,647	—
Central Park Zoo project (note 10)	—	206,343	206,343	—
Total program services	**15,090,625**	**2,452,884**	**17,543,509**	**—**
Supporting services.				
Management and general	1,453,734	—	1,453,734	—
Fund raising	668,611	—	668,611	—
Total supporting services	**2,122,345**	**—**	**2,122,345**	**—**
Total expenditures	**17,212,970**	**2,452,884**	**19,665,854**	**—**
Excess of expenditures over operating support and revenue, carried forward	**$ (36,783)**	**(112,096)**	**(148,879)**	**—**
Excess of expenditures over operating support and revenue, brought forward	**(36,783)**	**(112,096)**	**(148,879)**	—
Bequests	264,384		264,384	—
Realized net gain on investments	1,009,564	—	1,009,564	—
Excess of support and revenue over expenditures before capital additions	1,237,165	(112,096)	1,125,069	—
Capital additions (deductions):				
Contributions	—	—	—	3,594,180
Realized net gain on investments	—	—	—	1,693,473
Total capital additions	—	—	—	5,287,653
Excess (deficiency) of support and revenue over expenditures after capital additions	1,237,165	(112,096)	1,125,069	5,287 653
Fund balances at beginning of year (note 8)	5,366,993	—	5,366,993	8,287,850
Other changes:				
Expiration of term endowment (note 4)	—	—	—	(1,455,871)
Capital outlay financed by general funds	(112,096)	112,096	—	—
Fund balances at end of year	**$ 6,492,062**	**—**	**6,492,062**	**12,119,632**

Statement of Changes in Financial Position
Year ended June 30, 1981

	Operating funds	Endowment funds
Resources provided:		
Excess of support and revenue over expenditures before capital additions	$ 1,125,069	—
Capital additions		
Contributions	—	3,594,180
Realized net gains on investments	—	1,693,473
Excess of support and revenue over expenditures after capital additions	1,125,069	5,287,653
Items which do not use resources—realized net gain on investments	(1,170,277)	(1,693,473)
Decrease in grants receivable	440,261	—
Decrease in prepaid expenses and deferred charges	27,517	—
Decrease in inventories	70,150	—
Proceeds from sale of investments	38,530,598	55,446,471
Increase in accounts payable and accrued expenses	86,939	
Increase in accrued employee benefit costs	71,183	—
Total resources provided	**39,181,440**	**59,040,651**
Resources used		
Increase in accounts receivable	555 933	—
Decrease in deferred support and revenue	164,846	—
Purchase of investments	38,126,488	57,584,780
Total resources used	38,847,267	57 584,780
Other changes		
Expiration of term endowment	—	(1,455,871)
Increase in cash	$ 334,173	—

See accompanying notes to financial statements

New York Zoological Society - Notes to Financial Statements
June 30, 1981

1. Summary of Significant Accounting Policies
The financial statements of the Society have been prepared on the accrual basis except for depreciations as explained below. Other significant accounting policies follow:

Fund accounting
In order to ensure observance of limitations and restrictions placed on the use of available resources, the accounts are maintained in accordance with the principles of fund accounting. This is the procedure by which resources for various purposes are classified for accounting and reporting purposes into funds established according to their nature and purposes. Separate accounts are maintained for each fund; however, in the accompanying financial statements, funds that have similar characteristics have been combined into fund groups.

The assets, liabilities and fund balances of the Society are reported in two self-balancing fund groups:

Operating funds, which include unrestricted and restricted resources:
Unrestricted funds represent the funds available for the support of Society operations

Funds restricted by the donor, grantor, or other outside party for particular operating purposes (including accessions and other capital additions) are deemed to be earned and reported as revenues of operating funds when the Society has incurred expenditures in compliance with the specific restrictions. Such amounts received but not yet earned are reported as restricted deferred amounts.

Endowment funds, which include the following restricted resources:
Funds that are subject to restrictions of gift instruments requiring in perpetuity that the principal be invested and only the income be used.

Term endowment funds which must be held intact except that, at some future date or specified occurrence, some portion or all of the principal may be used (see note 4).

Plant assets and depreciation
Expenditures of operating funds for plant acquisitions including buildings and improvements constructed on land owned by the City of New York are not capitalized, and accordingly depreciation is not recorded in the Society's financial statements

Collections
Expenditures for collections are not capitalized

Other matters
All gains and losses arising from the sale, collection or other disposition of investments and other noncash assets are accounted for in the fund that owned the assets. Ordinary income from investments, receivables, and the like is accounted for in the fund owning the assets, except for income derived from investments of endowment funds, which is accounted for, if unrestricted, as revenue of the unrestricted operating fund or, if restricted, as deferred amounts until the terms of the restriction have been met.

Enforceable pledges for operating purposes, less an allowance for uncollectible amounts, are recorded as receivables in the year made. Pledges for support of current operations are recorded as operating fund support. Pledges for support of future operations are recorded as deferred amounts in the operating fund. Pledges to the Animal Kingdom Fund are recognized upon payment of the pledge.

2. Investments
Investments are reflected at cost or fair market value at date of gift. The market value and carrying value of investments by fund at June 30, 1981 were as follows:

	Market value	Carrying value
Operating funds—expendable	$ 7,628,729	6,735,748
Endowment funds—nonexpendable	13,178,581	12,119,632
	$ 20,807,310	18,855,380

Seven white-naped crane chicks were hatched at the Zoo in 1980–81.

Details of investment assets at June 30, 1981 were as follows:

	Market value	Carrying value
Cash	$ 808,069	808,069
Short-term investments	1,791,000	1,791,000
Corporate stocks	16,201,441	14 277,561
U.S. Government obligations	2,006,800	1,978,750
	$ 20,807,310	18,855,380

Assets of endowment funds and funds designated for long-term investment are pooled at market value basis with each individual fund subscribing to or disposing of units on the basis of the value per unit at market value, determined quarterly. Of the total units, each having a market value of $173.39, 76,005 units were owned by the endowment funds and 43,997 units were owned by operating funds at June 30, 1981 The average earnings per unit, exclusive of net gains, approximated $11.66 for the year

The following tabulation summarizes changes in relationships between carrying values and market values of investment assets:

	Market values	Carrying values	Net gains
End of year	$ 20,807,310	18,855,380	1,951,930
Beginning of year	15,713,723	14,257,431	1,456,292
Unrealized net gains for the year			495,638
Realized net gains for the year			2,863,750
Total net gains for the year			$ 3,359,388

The New York State Not-for-Profit Corporation Law, which became effective on September 1, 1970, permits the use of realized gains on investment transactions of endowment funds. Such gains are currently being added to principal but may be utilized at the discretion of the Board of Trustees

3. Grants receivable

Grants receivable of the operating funds represent amounts pledged to the Society for certain operations and for the completion of particular projects in future years. Certain grants are expected to be collected, as expenditures for those projects are made by the Society

4. Term endowment

During 1976, the Society initiated the Animal Kingdom Fund as a capital funds drive. The Fund was established as a term endowment fund to serve various functions as described below. The Fund is subject to the following conditions:

(a) The income of the Animal Kingdom Fund shall be used for the general operating purposes of the Society; and

(b) The principal of the Animal Kingdom Fund may be expended only upon the affirmative vote of two-thirds of the Trustees present at any duly held meeting of the Board of Trustees or its Executive Committee (i) to finance programs or improvements to facilities (i.e., the Bronx Zoo, the New York Aquarium, or other facilities of the Society) to produce revenue or increase attendance, or (ii) to ensure the survival of the Society if funds from other sources fail to provide sufficient revenue to maintain the Society's programs; provided, however, that in the case of any contribution to the Animal Kingdom Fund which was subject to a restriction not to expend the principal of such contribution without the prior consent of the donor thereof, in addition to the vote of the Trustees described above, such consent must be obtained in writing prior to the expenditure of such principal. For the year ended June 30, 1981, the Society recognized as operating support and revenue expired term endowments aggregating $1,455,871. Such funds were utilized as follows:

Children's Zoo	$ 827,733
Sea Lion Pool	151,473
Marine Mammal holding facility	106,953
Animal Kingdom magazine	64,036
Tour trains	55,222
Jungle World	44,111
Central Park Zoo project	206,343
Total	$ 1,455,871

Pledges to the Animal Kingdom Fund aggregating approximately $1,700,000 are due to be collected as follows:

Fiscal year	Amount
1982	$ 450,000
1983	630,000
1984	470,000
1985	100,000
1986	50,000

5. Pension Plan

All eligible Society employees are members of the Cultural Institutions Retirement System's (CIRS) Pension Plan. Pension expense was approximately $690,000, of which approximately $332,000 was financed by an appropriation from the City of New York The current year's provision includes amortization of prior service costs over a period of 30 years commencing June 30, 1974 The Society's policy is to fund pension cost accrued and no unfunded vested benefits existed as of June 30, 1980, the date of the latest plan valuation

Certain employees of the Society were formerly participants in the Society's pension fund Effective January 1, 1975, benefits of the CIRS Plan were substituted for benefits previously accrued under the Society's pension fund The market value of the assets of the pension fund approximated $2,150,000 as of June 30, 1981 and exceeds the past service liability associated with the participants of the former plan It is intended that these assets be used to fund current pension costs. During 1981, $200,000 was used for pension payments and is reflected as revenue in operating funds It is the opinion of management that the assets of the pension fund will be sufficient to fund these past service costs

6. Deferred restricted support and revenue

The changes in deferred support and revenue for the year ended June 30, 1981 are as follows

Balance at beginning of year	$ 2,312,473
Additions:	
Contributions and fund-raising events	1,881,736
Fees and grants from governmental agencies	197,786
Investment income	225,971
Net gain on investment transactions	160,713
Other	186,922
	4,965,601
Less funds expended during year	2,817,974
Balance at end of year	$ 2,147,627

7. Collections

During the year ended June 30, 1981 accessions of collections aggregated approximately $118,711 while de-accessions aggregated approximately $72,787

8. Accounting for Compensated Absences

In November 1980 the Financial Accounting Standards Board issued Statement No. 43, "Accounting for Compensated Absences" (the "Statement") which requires that unpaid costs associated with compensated absences of employees be recorded as liabilities. In accordance with the Statement, the Society changed its method of accounting for the costs of salaried employees' vacation and compensated pay benefits retroactively, the effect of which was to reduce the unrestricted fund balance as of June 30, 1980 by $489,671

9. Trust funds

The Society is the ultimate beneficiary under a trust held by Community Funds, Inc. of New York, N.Y. The income arising from the investments of the principal is paid to the Society for operating purposes and in fiscal 1981 amounted to $89,000.

10. Central Park Zoo Project

The Society and the City of New York have drafted an agreement with respect to the Central Park Zoo (CPZ) The Agreement provides for the City's renovation of CPZ at the City' expense in accordance with plans developed by the Society and approved by the City, and thereafter, for the Society's operation and management of CPZ, with funding from the City, for an initial 50-year term, renewable by the Society for five additional 10-year terms As of August 21, 1981, the Agreement was not final.

The Society is developing a renovation plan and estimates of the funding required for the complete renovation of CPZ. The Society has agreed to contribute up to $1,000,000 toward developing the renovation plan. Through June 30, 1981, the Society had expended $283,80 on this project.

Contributions, Pledges, and Payments on Pledges of $1,000 and Over

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Christopher Reeve ("Superman") with Freddie the fennec fox at the new Children's Zoo.

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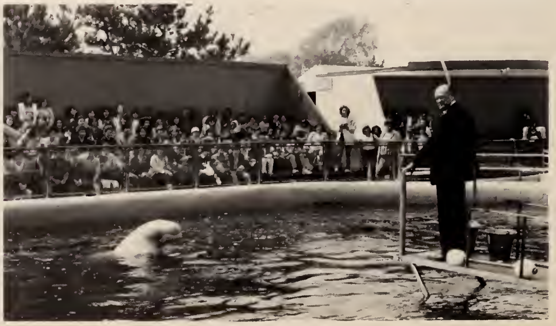

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The Trustees of the Society recommend that for estate planning purposes, members and friends consider the following language for use in their wills:

> "To the New York Zoological Society, a not-for-profit, tax-exempt membership organization incorporated by the laws of the State of New York in 1895, having as its principal address the New York Zoological Park, Bronx, New York 10460, I hereby give and bequeath ______ for the Society's general purposes."

If you want to restrict your bequest, please be in touch with Gregory Long of the Public Affairs Office, (212) 220-5090. In order to prevent the Society from incurring future administrative cost, it would be helpful if you would consider the addition of the following language to any restrictions which you may wish to impose on your bequest:

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Howard Phipps, Jr.
President

Cover:

*The discovery of a new species is a rare and important event, especially when that species is nearly extinct. Dr. John Gibbons came across the crested iguana on the Fijian island Yaduatoba, a 173-acre patch of land in the South Pacific, while searching for new specimens of the related banded iguana (*Brachylophus fasciatus*). Exclusively dependent on leaves, fruits, and flowers for food, the brilliantly colored reptile was losing its competition with free-roaming domestic goats when Dr. Gibbons came to the island. Defoliation by goats had led to serious erosion, and the available forage for iguanas was rapidly declining. With prompting from Dr. Gibbons, Yaduatoba was declared a sanctuary in August 1980, and the removal of goats was begun.*

Dr. Gibbons' work is part of the international program of the New York Zoological Society's Animal Research and Conservation Center (ARC), which currently supports sixty-one research and education projects around the globe. The work of ARC over the past eighteen months is described on pages 45-49.